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The Commonwealth of Massachusetts

ANNUAL REPORT

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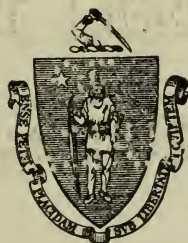
Mass. Dept. of Conservation:

Division of Fisheries and Game

FOR THE

YEAR ENDING NOVEMBER 30, 1928

DEPARTMENT OF CONSERVATION



CX

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The Commonwealth of Massachusetts

The Director of Fisheries and Game herewith presents the sixty-third annual report.

GENERAL CONSIDERATIONS

The protection and propagation of wild life throughout the country has developed very slowly, due very largely, if not entirely, to the fact that the rank and file of anglers and sportsmen have always regarded fishing and hunting as cheap sports. It was only a few years ago that this group of our citizens highly resented the suggestion of a license fee as a medium through which they should contribute toward the maintenance of an adequate wild life stock. The original hunting and fishing license fees were ridiculously small, but they were the best that could be obtained considering the existing sentiment. While times have changed and the anglers and hunters more clearly perceive the reasonableness of the proposition, nevertheless the work of protection and propagation drags, due to the fact that we still persist in regarding hunting and fishing as sports which can be enjoyed at small cost. A large percentage of us still persist in nursing the hope that some miracle will occur to restore the abundance of the past. Too many of us insist on harboring the fallacy of the God-given right of free hunting and fishing. Some still nurse the chimera of a so-called American system of free fishing and hunting. These ideas must be thrown into the discard once and for all if we are to deal with this problem on its merits.

The protection and the propagation of those forms of wild life which are used for sporting purposes is today recognized as a business. We hope their pursuit and capture in the wild can always be surrounded with some of the romance of earlier days. But this will have to result from the cultivation of a vivid imagination rather than from the actual reality.

Though the process may be painful, the time has come to talk in terms of relative values, and in a comparative way, of past, present and future opportunities to enjoy a day afield. In the densely settled sections of the country it is useless to hope for the return of certain species of large mammals classed as game. Likewise it is nursing a dream to expect, in the future, to fish in crystal streams flowing through primeval forests. In many of our streams and other waters, natural reproduction of fish life cannot be counted on for any appreciable additions to the wild life stock. In many sections only the artificially propagated species of game (such as the pheasant) can be relied on for sport.

If we are correct in our premise, that providing certain species of birds, mammals and fish for sporting purposes is a business proposition, then the question of financing the enterprise is the most important consideration. Today all of the things the Division does for the anglers and hunters are financed entirely by appropriations based on the amount of the revenues from sporting licenses and fines. The present sporting license system has been in effect since January 1, 1926, and we have about reached our maximum revenue under the existing set-up. But the demands for an increased volume of wild life to provide increased opportunities for recreation continue uninterrupted, and but two ways appear available by which to meet these demands.

The first has to do with increasing the revenues of the Division. Apparently this can be accomplished only by increasing the present license fees and by providing a system of issuing licenses whereby most of the fees now retained by the city and town clerks, may be saved. On many occasions we have stressed the fact that hunting and fishing may be regarded as cheap sports. We have pointed out that no equal volume of recreation can be obtained at the price of a sporting license, now costing \$2.25. It entitles the holder to either hunt or fish for something during every month of the year. The fair and democratic attitude of our land owners permits this to be done on lands which the license holder is paying nothing to maintain. Tested on any scale of values the present license fee is entirely out of proportion to the privileges represented in it, and should be substantially increased. Our request for legislation to authorize the Director to appoint volunteer agents to issue sporting licenses without charge has so far been denied favorable action in the Legislature. We have carefully studied the matter, and see no objection to, and every argument in favor of, adopting the Oregon system, whereby such volunteer agents (sporting goods dealers, hardware stores, etc.), handle the entire annual output of licenses without cost. The State could be protected against financial loss through the purchase of a blanket bond covering all agents as fast as chosen. The reasons that such agencies are willing to act *gratis* are obvious. No change in our present method of dealing with the city and town clerks would be required in order to handle any number of additional volunteer agencies. At present one-ninth of the entire sum paid for sporting licenses goes to the city and town clerks in fees. This year we issued 120,018 sporting and trapping licenses, and out of the total proceeds \$29,652.00 was retained by clerks. But the revenues from licenses and fines will never be sufficient to enable the Division to entirely meet the annual demands on our wild life stock. The State's work must be supplemented by that of individuals, which leads to the second possibility. This lies in the willingness of individuals and associations to either purchase or rear birds, mammals and fish to supplement the Division's work of protection and production. A great deal of interesting work along this line has been performed by individuals and clubs over a period of time. For some years we have annually provided them with eggs for hatching and rearing pheasants. Starting with a few thousand, the output during this year was 12,711 eggs. For some years certain local fish and game associations have built the pools and provided the food to rear to fingerling size small trout supplied by the Division.

Three years ago the foregoing group began to supply covered pens in which to carry through the fall and winter young pheasants from our game farms to be liberated the following spring as adult birds. Practically the entire output of pheasants from the game farms this year are now in pens so provided, and will be fed and carried through the winter without expense to the Division. A greater public participation in this work is bound to come as the possibilities are more fully understood by the rank and file.

The Division will encourage and assist in these matters by supplying the young stock as far as possible, and having its staff advise as to the suitability of breeding pens and pools to handle the stock. It will only be a question of time when experts in our employ will devote practically their entire time to such work. In this way many individuals will be discovered who have real ability in game and fish breeding, and they will be encouraged to perfect themselves in the work. Many individuals and associations not in a position to do the actual work, will contribute by purchasing stock from commercial dealers, and we hope that this will result in the establishment of an increasing number of commercial game farms and fish hatcheries. There is a very great field for such private enterprises, not the least important feature of which is the fact that they are a guarantee of an increasing supply should the game farms and fish hatcheries of the State in a given year be ravaged by disease, floods or other disasters.

A further public participation in a sane program of vermin control is essential. Divisional agents can never adequately control the situation. The average hunter and fisherman usually is enthusiastic in his pursuit of game or fish, but at the end of the open season loses his interest, and does practically nothing through the periods closed to shooting, to assist in reducing to a harmless minimum certain predatory species that take an enormous toll in the course of a year.

With the Division functioning to the largest possible proportions by reason of a properly adjusted scale of license fees, assisted by individuals and associations along the lines indicated above, together with the establishment of an adequate system of permanent wild life sanctuaries, and enlarged powers for our wardens that they may be an effective rural police force to protect the rights and property of the land owners, we should be able to provide an increasing amount of wholesome, health-giving recreation. There is nothing Utopian in the picture. The employment of sound business methods, together with a willingness on the part of the rank and file to do their share, will bring the desired result.

PERSONNEL

On July 11, 1928 William C. Adams was reappointed as Director of the Division of Fisheries and Game.

FINANCES

Appropriations

	Appropriations	Expenditures	Balances	Corrected balances (See foot-notes)
<i>Maintenance</i>				
Salary of the Director	\$4,000.00	\$4,000.00	—	—
Personal Services, Office Assistants	10,180.00	10,154.73	\$25.27	\$25.27
Office Expenses	7,500.00	7,381.06	118.94	118.94
Education and Publicity	1,000.00	940.32	59.68	59.68
Enforcement of Laws:				
Personal Services	66,000.00	63,781.65	2,218.35*	5,063.88
Expenses	40,000.00	34,654.47	5,345.53*	
Biologists:				
Personal Services	5,100.00	5,094.00	6.00	6.00
Expenses	2,500.00	2,492.01	7.99	7.99
Propagation of Game Birds, etc.	99,700.00	99,608.55	91.45	91.45
Damages by Wild Deer and Wild Moose (Ch. 127, Acts 1928)	9,000.00			
Deficiency—Damages by Wild Deer and Wild Moose (Ch. 127, Acts 1928)	2,673.26	9,727.41	1,945.85*	1,945.85†
Protection of Wild Life	3,400.00	3,393.55	6.45	6.45
Marine Fisheries:				
Personal Services	10,740.00	10,582.00	158.00	158.00
Expenses	3,300.00	3,226.27	73.73	73.73
Enforcement of Shellfish Laws:				
Personal Services	9,300.00	7,992.90	1,307.10	1,307.10†
Expenses	6,000.00	6,997.15	2.85	2.85
Expenses	1,000.00			
Purchase of Lobsters	7,500.00	4,952.94	2,547.06	2,547.06**
<i>Special Appropriations</i>				
Improvements and Additions at the Fish Hatcheries and Game Farms	10,000.00	10,106.31*	(Apparent Overdraft) \$106.31	2,393.69†
Bounty on Seals (C. 127, Acts of 1928)	250.00			
Bounty on Seals (C. 405, Acts of 1928)	350.00			
Deficiency Bounty on Seals (C. 127, Acts of 1928)	200.00	800.00	—	—
	\$299,693.26	\$285,885.32	—	\$13,807.94
Less amounts available for use in 1930				4,339.54†
Amount actually returned to the Treasury				\$9,468.40
<hr/>				
Balance available from 1927 appropriation for Damages by Wild Deer and Wild Moose, expended in 1928	\$0.59	\$0.59	—	—
Balance available from 1927 appropriation for Improvements and Additions at Fish Hatcheries and Game Farms, expended in 1928	510.62	497.82	—	\$12.80

* On Oct. 24, 1928, the Governor and Council approved a request of the Director that the sum of \$2,500 be transferred from "Extraordinary Expenses" to the appropriation of \$10,000 for Improvements and Additions at the Fish Hatcheries and Game Farms. This was on the understanding that an equal amount would be returned unexpended from the total appropriation of \$106,000 for Enforcement of Laws. Inasmuch as two years are permitted within which to make expenditures against the item for Improvements and Additions at the Fish Hatcheries and Game Farms, there was carried over into the fiscal year 1929 an unexpended balance of \$2,393.69. The remaining balance under Enforcement of Laws, \$5,063.88 (\$2,218.35 plus \$5,345.53 less \$2,500) was returned unexpended for the reason that we had asked for the sum of \$5,000 to reprint the fish and game laws, but during the year it was decided to postpone the printing of the laws for another year, or until the remaining original law books and supplements could be used up.

† Available for use in 1930.

‡ Two additional wardens were appointed to the coastal warden force, but not until October 19, since the appropriation for operating expenses was insufficient for any longer period of time.

** The law authorizing the purchase of egg-bearing lobsters did not become effective until July 25. Many lobster fishermen liberated egg lobsters without seeking compensation.

REVENUE

The revenue turned into the State Treasury for the period of the fiscal year was: for sporting and trapping license fees, \$241,870; (see detail below); payments to balance unsettled license accounts of previous years, \$37.70; lobster license fees, \$930.75; rent at hatcheries, \$332; sale of lobster meat permits, \$380; sale of shiner permits, \$305; lease of clam flats, \$15; sale of game tags, \$25.10; sale of confiscated goods, \$85.79; sales at hatcheries, \$175; sale of miscellaneous goods, \$22.94; fines turned into

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the State Treasury from county treasuries as a result of fish and game law violations, \$10,017.95; total, \$254,197.23.

Detail of receipts from Sporting, Trapping and Lobster Licenses

Kind	Total Number Issued	Gross Value	Fees to Clerks	Net Re- turn to State
Resident Sporting (\$2.25)	107,615	\$242,133.75	\$26,903.75	\$215,230.00
Resident Trapping (\$2.25)	3,547	7,980.75	886.75	7,094.00
Non-resident Sporting (\$5.25)	2,043	10,725.75	510.75	10,215.00
Non-resident Trapping (\$5.25)	48	252.00	12.00	240.00
Non-resident Sporting (\$2.25)	507	1,143.75	126.75	1,017.00
Non-resident Trapping (\$2.25)	10	22.50	2.50	20.00
Alien Sporting (\$15.25)	331	5,047.75	82.75	4,965.00
Alien Trapping (\$15.25)	9	137.25	2.25	135.00
Minor Trapping (\$0.75)	4,498	3,373.50	1,124.50	2,249.00
Duplicate Licenses (\$0.50)	1,410	705.00	—	705.00
	120,018	\$271,522.00	\$29,652.00	\$241,870.00
Lobster (\$1.00)	1,095	\$1,095.00	\$164.25	\$930.75

During the past several years we have annually discussed the financial set-up of the Division with the anglers and hunters, through the medium of letters to the local organizations. For many years there has been more or less indifference, on the part of those providing the revenues, as to the extent to which these are translated into appropriations. The first active interest displayed by any group occurred when the Dedham Hunting and Fishing Association filed with the Legislature this year, a bill to create a Massachusetts Sportsmen's Fund. In brief, it proposed to set aside the revenues from sporting licenses and fines in a separate fund, to be expended by the State in carrying on the work of this Division of direct benefit to those who provided the revenue. A public hearing was given by the Ways and Means Committee and the merits of the bill were ably presented by representatives of the Association. A large group of sportsmen, members of the Legislature and others attended the hearing. While the bill was given "Leave to Withdraw," nevertheless the discussion of it centered the attention of the public on the Division's finances. The appropriation to carry on our work of direct benefit to the anglers and hunters was larger than the revenues for 1927 by, roughly, \$5,700 which showed a tendency on the part of the government to clean up the arrears.

The situation was very thoroughly canvassed in the letter which we annually submit to the Budget Commissioner in connection with the forecast for appropriations for the succeeding year. This letter is, therefore, quoted in full, as follows:—

"November 15, 1928.

Hon. Charles P. Howard,
Commission on Administration and Finance,
State House, Boston, Mass.

Dear Commissioner:

"The following refers to the annual forecast filed by us for the annual budget. The total amount is large, but we feel we should reveal to you what this Division should have if it is to adequately meet the demands of the public.

"We are following the plan of recent years in sub-dividing the forecast into three parts. We will discuss them as follows:

"Part I. ADMINISTRATION OF CENTRAL OFFICE, AND THE PROPAGATION AND PROTECTION OF FRESH-WATER FISH AND GAME. When the present sporting license law was under consideration in the Legislature for 1925, it was tacitly understood by all concerned

that if this act were passed and additional revenues provided,—in the future annually a sum would be appropriated to do the things of direct benefit to the anglers and hunters (who pay in the money or cause fines to be imposed by the warden force), equal to this annual revenue. No one has ever disputed the foregoing statement.

“When a bill to provide a separate fund of these revenues was before the Legislature this year I took the matter up with His Excellency the Governor. I immediately drafted a statement of the substance of that interview and sent it to his office for confirmation, and later read it to the Ways and Means Committee. It is as follows:

“The Governor expressed the opinion that there might be some merit and interest in the plan represented by this bill. But he felt that it was embarking on a rather dangerous course to fix for certain purposes any portion of the annual revenue of the State. That while it might be productive of good, it might also result in tying the hands of the government at any time where it would appear that even greater good might result from the more open arrangement of the unrestricted budget system.

“That until it had been demonstrated over a period of years that a grave injustice had been done to those who were contributing the money that he felt it would be better to adhere to the present system. *But that it was his feeling that from year to year the income from these special sources should be for all practical purposes applied to the objects for which the funds were more particularly provided.*”

“I call your attention especially to the last sentence (the italics are mine.)

“Attached hereto is an analysis of the revenues and appropriations since this new law went into effect on January 1, 1926. It shows that \$45,266.43 of these revenues have not been appropriated for the direct benefit of those who paid in the money.

“On the basis of the above, we believe it is only just to these anglers and hunters that from January 1, 1926 on, these revenues should be handled as a continuing account. If they paid in the money and it was not appropriated in a given year, or if for good business reasons an appropriation was not entirely spent—it should not be argued that the balance lapsed. These are special funds, contributed for special purposes. If the purposes were not annually present the State would not receive this money. If the State were not doing these things for the anglers and hunters no one would think of imposing such a license system to increase the general revenues. Therefore, if the State accepts these revenues for specific purposes it constitutes a trust and the entire amount should be devoted exclusively to those purposes. Whether it is all done in a given year is immaterial—so long as it is done over a period wherein there is no more delay than the complexities of State administration make necessary. In a number of States these revenues are carried as a special fund. If they are not all spent in a given year the balance is added to the fund.

“In this analysis we have charged against the annual revenues every item which we consider was of benefit to the anglers and hunters. In addition we have assumed the payment of deer damages for 1926 which was never contemplated even in the budget for that year. We have included such items as all the salary of the Director and the salaries and operating expenses of the office force, all telephone charges, etc.,—although a considerable amount of time and some expenditures were made on behalf of the marine fisheries and the non-game wild life of the State. Also all the cost of maintaining the Heath Hen Reservation and Penikese Island Sanctuary, in 1926, and part of such cost for 1927 and 1928. We maintain these are of greatest value to the lovers of non-game birds. The

Heath Hen ceased to be a game bird fifty years ago. Penikese Island was set apart as a sanctuary primarily to protect the great colony of terns on it.

"From this analysis it appears, on a conservatively estimated basis, that the annual revenues for 1928 from licenses and fines will be about \$253,677.54. A revised estimate of the income for 1929 indicates revenues of an equal amount.

"In making up your budget for this Division for 1929 we believe that to the foregoing sum should be added the \$45,266.43 arrears, and that the total amount of the budget to do the things of direct benefit to the anglers and hunters should be not less than \$298,943.97—or a round sum of \$299,000.

"In this we are asking nothing more than the return to the anglers and hunters of the money they have actually provided. In previous letters accompanying the annual forecast we have pointed out that it would be good business to increase the annual appropriation to more than the actual cash paid in,—say an additional ten per cent. The work of this Division must enlarge if we are to begin to meet public demands on it. This means larger appropriations. To lay the basis of these larger appropriations we need more revenues. The hundred and twenty thousand sportsmen involved pay their share of the general taxes. Were they encouraged to pay larger special fees by the State appropriating annually a sum in excess of those fees, we could build up the Division at a relatively small cost to the general tax payers. This is about as far as we can go in applying the self-supporting principle to any division of the government.

"Attached hereto is a memorandum in which I have made an allocation of the above sum of \$299,000, for your consideration.

"In this memorandum we have included an item for the payment of deer damages, but we continue to do this under protest—insisting, as we did in our letter of November 28, 1927, that these deer damages should be paid for by funds raised by general taxation. No one will oppose the proposition—that the maintenance of an abundant stock of all forms of beneficial wild life is a highly desirable part of our State and national existence. It adds to the joy of living of our people to such an extent, that it can rightly be considered a basic requirement in our every-day life. It provides an aesthetic influence with which we cannot afford to part. But this body of wild life cannot be preserved without expense. If its maintenance injures one of our industries to the extent that it is advisable to reimburse the industry for damages, the cost should be paid out of the general tax levy as part of the price which we pay to preserve a wholesome, well-balanced community life. The only important item is destruction by deer to certain growing crops and trees. This cost should not be charged to the anglers and hunters who today are the only ones contributing toward the maintenance and increase of this wild life, although it is beneficial to all our people.

"Also in this memorandum we show that the greatest need of the Division right now (in this part of our activities) is for a large appropriation under the item of 'Specials: Improvements and Additions at Game Farms and Fish Hatcheries.' This would enable us to do two things—(1) purchase all the lands and buildings thereon which we are now carrying under leases with options of purchase at prices stipulated in the leases; and, (2) make needed additions to our existing plants to enlarge their production to meet the growing demands. We especially need more rearing space at our game farms.

"Some of these lands we have been carrying for years at annual rentals running from six to ten per cent of the purchase prices. His Excellency the Governor looked into this matter last year. At his request I gave him a list of all our holdings. Also a statement showing they are inseparably tied in with our work and that we should own every one of them. Commenting on the situation he wrote to me on February 23, 1927 as follows:

"Please accept my thanks for your memorandum giving me the list of holdings that the State owns or is hiring for wild life development.

"Will you give me an outline of your future requirements? Is it your opinion that we own or are hiring all the land we need? and if not, what are your future plans?

"For example, if you have all the land you think we are going to need for a while, I think we might well consider purchasing the \$5,000 worth of land that we have at the Ayer Camp. The \$400 rental represents the equivalent of 8% on \$5,000. I am assuming that our use of the farm is aiding in its value all the time, and that being the case I should think if it is a valuable and essential possession for the department that we better buy it than hire it.

"At Sutton, on land the price of which is \$2,000, we are paying a rental of 10% or \$200, both at the Stockwell Ponds and at the Fish Cultural rearing unit.

"At East Sandwich, the rental runs over 10%, as it does at Amherst and Sunderland."

"Since 1922 we have received the following appropriations for 'Specials': 1923, \$4,750; 1924, \$4,800; 1925, nothing; 1926, \$5,000; 1927, \$8,000; 1928, \$10,000. It is hopeless with such sums to take care of the annual repairs and replacements, purchase lands and expand our six fish hatcheries and four game farms to keep up with the demands for more stock.

"PART II. NON-GAME BIRD RESERVATIONS AND WILD LIFE SANCTUARIES. We continue to include in this sub-division the cost of operating the Martha's Vineyard Heath Hen Reservation and the Penikese Island Sanctuary. As we have stated over and over again, the Heath Hen Reservation cannot possibly be considered as a sporting proposition. While we maintain a limited number of cottontails and a few quail on Penikese Island, as well as decoys to try and make it a way-station for wild fowl, it was set aside as a sanctuary primarily to protect the magnificent colony of terns which has occupied it for many years. In a statement to the local fish and game associations on February 20, 1928, reporting on the hearing before Ways and Means on the bill to establish a separate fund of license fees, I tried to smooth over the fact that part of the revenues would be used to maintain these two stations. This was done to allay a strong resentment against the defeat of this bill. It was not an admission that such costs should be included as a charge against these revenues.

"This sub-division contains some of the things the State should do out of the general tax levy to supplement the things which the anglers and hunters are paying for, in order to protect and preserve our wild life as a whole. The inland wardens, supported entirely by the anglers and hunters, protect the song and insectivorous and non-game birds. Our game farms and fish hatcheries are sanctuaries for such birds, and much of the time of the employees of the central office is taken up in the interest of this stock.

"During past years individuals and organizations have deeded to the State lands to be sanctuaries. While these are relatively small, much can be done to enlarge their usefulness. Such action will stimulate these donors and others to enlarge these areas, and provide funds to help out.

"In this part we are asking for the funds to establish one or more wild life sanctuaries. On February 24, 1927, I reported to His Excellency the Governor on this subject, as follows:

"Aside from the several small parcels which have been contributed by the Federation of the Bird Clubs of New England and

others, together with the Martha's Vineyard Reservation, and Penikese Island, we have no lands acquired primarily as wild life sanctuaries. Our State Forests and some of the sizable tracts under the control of other departments are, to a certain extent, such sanctuaries. But the first group was acquired primarily for reforesting purposes, and the latter group for the uses of the institutions. The selection of areas to be permanent wild life sanctuaries involves considerations quite different from those controlling the purchase of the last two groups. A sanctuary should include upland, meadow and swamp, in order to provide living conditions for the many varieties of desirable wild life. Reforestation is a minor consideration. Many parts of a sanctuary would be flowed, where possible, and even some forested areas would be cut back in the interests of bird and other animal life.

"Setting aside of an area as a sanctuary and the prohibition of hunting or fishing does not make such tract a sanctuary in the modern business of wild life conservation. In fact, these are only the first steps. To begin with, the tract should be large enough to permit of economic development as a sanctuary. It should be from two to four miles square. There should be a resident superintendent who will post the area, keep off poachers, trap vermin systematically throughout the year, plant food-bearing cereals, shrubs and trees, do the damming and cutting above referred to, carry on a limited amount of artificial propagation, and feed during the winter. After such sanctuary has been well stocked, annually a limited portion of the increase could be trapped up and liberated on other sanctuaries.

"The establishment of say ten such sanctuaries, evenly distributed across the State, is the only permanent guarantee of the maintenance of a stock of wild life. These sanctuaries would cover from three to five thousand acres. Suitable lands ought to be obtained at an average cost not to exceed five dollars an acre. When once established, the ultimate annual cost of maintenance should not exceed \$2,500 to \$3,000 a year.

"The extent to which the Commonwealth should embark upon a program of establishing such sanctuaries bears so closely on the whole question of financing the State's activities that it cannot be considered as standing alone. We estimate that at least a million and a half of our people (who do not hunt or fish) are interested in our wild life and would approve the appropriation of some funds for this purpose. Moreover, we believe that, when the whole project is laid before our wealthier citizens, many of them will be willing to contribute land and funds toward the establishment of sanctuaries. There is evidence of a pronounced awakening of such class to these needs.

"I should not advocate expenditures by the Commonwealth for the establishment of such a group of sanctuaries at one time, or even within a short period of years. Rather I would approve the establishment of one, properly administered, to serve as an example to our people and an inspiration to that class which could well afford to contribute the funds necessary to establish others and endow their maintenance."

"Attached hereto is a memorandum in which I have made an allocation of the sum of \$29,190, for your consideration.

"PART III. MARINE FISHERIES. We have repeatedly urged that more attention should be given to the development of our marine fisheries. They represent our oldest industry. Manufacturing enterprises may be moved away; changing conditions may render other manufacturing plants

obsolete and worthless; but the marine fisheries will always be part and parcel of our industrial life.

"In our communication of November 29, 1926, accompanying the forecast we said:

"For many years the Commonwealth, and rightly, has expended substantial sums annually in the furtherance of agriculture. This money has been provided out of the funds raised by general taxation. In view of the fact that the marine fisheries are equally concerned, with agriculture, in producing a valuable food supply at a reasonable cost, we feel the marine fisheries should be financed out of funds raised by general taxation. One of our wholesale houses has summed up the whole situation as follows:

"We call your attention to the fact that the 'fishermen and the farmers feed the world. The sea and the soil provide our daily food.'

"There is a real demand for the enlargement of our Division of Fish Inspection. Ample facts are available to show that it has been beneficial to the industry itself, and of enormous benefit to the fish consuming public, by reason of an improvement in the quality of fish now being distributed throughout our State as food. There are other items detailed in the budget which should now begin to receive attention."

"The industry has entered on a period of expansion. New methods of catching, preserving and marketing sea products are being adopted. Organization under sane, aggressive leadership is taking place. In other words, this industry is coming and not going. The State should recognize that here is an industry that is localized, tied in with all our traditions, and has enormous potentialities. It can make a strong appeal to consumers in all parts of our country and abroad for its products should be in every home. Not to supply a caprice of appetite but for the reason these products are a necessity in order that all people will have a properly balanced food ration.

"Attached hereto is a memorandum on which I have made an allocation of \$133,269 for your consideration. But even this sum does not begin to cover the field of the State's usefulness to this industry. Just as one illustration I quote from the Fishing Gazette of August, this year:

"It is significant that the Canadian Department of Marine and Fisheries has provided a new wireless broadcasting for the Nova Scotia fishing fleets to be broadcast twice daily and to include: (1) Weather reports; (2) Bait reports from ten ports, showing the quantity of frozen bait in storage, the quantity of fresh unfrozen bait available and ice conditions; (3) Prevailing local prices for dried fish and stock-salted fish, including when possible, Boston and Gloucester quotations; and (4) News items covering catches of vessels arriving from the Grand Banks, outstanding fishing incidents such as loss of life or damage or loss of vessels, or other unusual events of interest to the fishermen, including urgent information as to the families of the fishermen."

"If I can give you any additional data please do not hesitate to call on me.

Very truly yours,

WILLIAM C. ADAMS, *Director.*"

(The enclosures to the foregoing letter, follow.)

ANALYSIS OF REVENUES AND APPROPRIATIONS

ADMINISTRATION OF CENTRAL OFFICE, AND THE PROPAGATION AND PROTECTION OF FRESH-WATER FISH AND GAME

1926	Revenue (licenses, fines, etc.) (a)	\$236,031.20
	Appropriation (portion for benefit of anglers and hunters, including money for deer damage) (b)	214,753.10
	Unappropriated	\$21,278.10
1927	Revenue (licenses, fines, etc.) (c)	253,496.30
	Total available for 1927	\$274,774.40
	Appropriation (the portion for the benefit of anglers and hunters including money for deer damage) (d)	229,693.75
	Unappropriated	\$45,080.65
	Unexpended balance of 1926 appropriation (e)	625.56
	Total arrears	\$45,706.21
1928	Revenue (licenses, fines, etc.—partly estimated) (f)	253,677.54
	Total available for 1928	\$299,383.75
	Appropriation (the portion for the benefit of anglers and hunters including money for deer damage) (g)	256,110.51
	Unappropriated	\$43,273.24
	Unexpended balance of 1927 appropriation (h)	1,993.19
	Total arrears	\$45,266.43

Detail of (a)—Revenue of 1926 analyzed

	Anglers and hunters	Non-game birds	Marine fisheries	General
Sporting license fees	\$225,757.65			
Lobster license fees			\$763.30	
Rent at Palmer Hatchery	144.00			\$74.95
Sale of game tags			85.00	
Sale of launch hull				
Sale of gravel	10.50			
Lease of Chilmark Pond			75.00	
Lease of clam flats			65.00	
Permits to take shiners	180.00			
Sale of fancy pheasants	45.00			
Conscience fund	1.00			
Overpayment of town clerks	2.85			
Fines	9,890.20			
Total revenue, \$237,094.45	\$236,031.20	—	\$988.30	\$74.95

Detail of (b)—Appropriation for 1926 analyzed

	Anglers and hunters	Non-game birds	Marine fisheries
Salary of Director	\$4,000.00		
Office assistants	9,660.00		
Expenses	8,000.00		
Exhibitions	1,000.00		
Enforcement of Laws:			
Personal services	60,500.00		
Expenses	24,000.00		
Biologists:			
Personal services	4,700.00		
Expenses	2,400.00		
Propagation	86,000.00		
Fish Inspection:			
Personal Services			\$7,860
Expenses			2,200
Expenses administering C. 370, Acts 1926, relative to marketing, taking, and transportation of shellfish, etc.			6,000
Bounty on seals			250
Damages by deer and moose	6,000.00		
Damages by deer, deficiency (although we do not admit that this is a proper charge against our revenues)	3,493.10		
Specials: For improvements and additions at fish hatcheries and game farms	5,000.00		
Total appropriation, \$231,063.10	\$214,753.10	—	\$16,310

Detail of (c)—Revenue of 1927 analyzed

	Anglers and hunters	Non-game birds	Marine fisheries
Sporting and trapping licenses	\$242,432.50		
Lobster license fees			\$1,066.75
Rent at Palmer Hatchery	180.00		
Sale of game tags	39.20		
Permits to take shiners, etc.	380.00		
Lease of clam flats			65.00
Lease of Chilmark Pond			75.00
Sale of wagon	10.00		
Sale of fox skin	10.00		
Sale of bird book	5.00		
Sale of forfeited muskrat skins	22.50		
Sale of forfeited deer	173.10		
Fines	10,244.00		
Total revenue, \$254,703.05	\$253,496.30	—	\$1,206.75

Detail of (d)—Appropriation for 1927 analyzed

	Anglers and hunters	Non-game birds	Marine fisheries
Director's salary	\$4,000.00		
Office assistants	10,620.00		
Office expenses	7,500.00		
Exhibitions	1,000.00		
Enforcement of Laws:			
Personal services	62,800.00		
Expenses	30,000.00		
Biologists:			
Personal services	4,710.00		
Expenses	2,400.00		
Fish Inspection:			
Personal services			\$9,375
Expenses			2,600
Enforcement of shellfish laws:			
Personal services			6,750
Expenses			3,600
Bounty on seals			250
Enforcement of shellfish laws			1,000
Expenses, investigation re shellfish			1,000

Detail of (d)—Appropriation for 1927 analyzed—Continued

	Anglers and hunters	Non-game birds	Marine fisheries
Propagation	89,663.75		
Damages by deer and moose (included, but we insist that these claims should not be charged against the revenues from licenses and fines)	9,000.00	\$3,400*	
*Protection of wild life			
Specials: For improvements and additions at fish hatcheries and game farms	8,000.00		
Total appropriation, \$259,005*	\$229,693.75	\$3,400	\$24,575

* \$350 was used to remove buildings from Egg Rock, and \$2,974.76 to pay part of the total cost of \$4,311.01 for maintaining Martha's Vineyard Heath Hen Reservation, Penikese Island Sanctuary and for a survey of Watic Mountain Sanctuary. The balance of \$1,336.25 for such maintenance was paid out of Propagation. Therefore the original Propagation appropriation of \$91,000 has been reduced by that amount. We claim the total cost of maintaining these two stations should be included in the Non-game Bird part of our appropriation, as their existence is of more benefit to the bird lovers as a class than to the anglers or hunters.

Detail of (e)—Balances returned unexpended at the close of 1926, from those appropriations which were for the benefit of the anglers and hunters

Office assistants	\$8.90
Office expenses	69.55
Education and publicity	2.52
Enforcement of Laws:	
Personal services	361.93
Expenses	48.54
Biologists:	
Personal services	56.82
Expenses	17.19
Propagation	60.11
	\$625.56

Detail of (f)—Revenue of 1928 (estimated) analyzed

	Anglers and hunters	Non-game birds	Marine fisheries
Sporting licenses:			
Actual to Sept. 1, 1928	\$187,102.65		
September	10,252.00		
October	12,960.00		
November (est.)	32,117.85		
	\$242,432.50		
Fines (est. same as 1927)	10,244.00		
Lobster licenses:			
Actual to Sept. 1, 1928	\$852.55		
September	57.80		
October	9.35		
November (est.)	147.05		
			\$1,066.75
Shiner permits:			
Actual to Sept. 1, 1928	\$110.00		
September	25.00		
October	135.00		
November (est.)	110.00		
	380.00		
Lobster meat permits:			
Actual to Sept. 1, 1928			370.00
Nothing since			
Game tags:			
Actual to Sept. 1, 1928	\$8.85		
September	—		
October	6.25		
	15.10		
Rent at Palmer Hatchery:			
Actual to Sept. 1, 1928	\$260.00		
September	24.00		
October	24.00		
November (est.)	24.00		
	332.00		
All following are actual to October 31:			
Lease of clam flats			15.00
Sale of muskrat skins	3.00		
Sale of confiscated furs	47.25		
Sale of gun	25.00		
Sale of cow	40.00		
Sale of deer	7.84		
N. E. Fair Association	14.10		
Sale of grass	15.00		
Sale hatching jars	120.00		
Reimbursement for badges	1.75		
Total estimated revenue, \$255,129.29	\$253,677.54	—	\$1,451.75

Detail of (g)—Appropriation for 1928 analyzed

	Anglers and hunters	Non-game birds	Marine fisheries
Director's salary	\$4,000.00		
Office assistants	10,180.00		
Expenses	7,500.00		
Publicity	1,000.00		
Enforcement of Laws:			
Personal services	66,000.00		
Expenses	40,000.00		
Biologists:			
Personal services	5,100.00		
Expenses	2,500.00		
Propagation*	98,157.25*		
Inspection of Fish:			
Personal Services			\$10,740
Expenses			3,300
Enforcement of shellfish laws:			
Personal services			9,300
Expenses			6,000
Bounty on seals			250
Bounty on seals (deficiency of 1927)			200
Enforcement of shellfish laws			1,000
Purchase of lobsters			7,500
Bounty on seals (in addition)			350
†Damages by wild deer and moose	9,000.00†		
†Damages by wild deer (1927 deficiency)	2,673.26†		
Protection of wild life		\$3,400	
Specials: For improvements and additions at fish hatcheries and game farms	10,000.00		
Total appropriation, \$298,150.51	\$256,110.51	\$3,400	\$38,640

* \$3,393.55 was used to pay part of the total cost of \$4,936.30 for maintaining the Martha's Vineyard Heath Hen Reservation and Penikese Island. The balance of \$1,542.75 for such maintenance was paid out of Propagation. Therefore the original Propagation appropriation of \$99,700 has been reduced by that amount. We claim the total cost of maintaining these two stations should be included in the Non-game Bird part of our appropriation, and their existence is of more benefit to the bird lovers as a class than to the anglers or hunters.

† Included, but under the same protest as in 1927, that these damages should not be charged to revenue from licenses and fines.

Detail of (h)—Balances returned unexpended at the close of 1927, from those appropriations which were for the benefit of the anglers and hunters

Office assistants	\$683.23
Office expenses	61.92
Education and publicity	4.45
Enforcement of Laws:	
Personal services	606.17
Expenses	44.32
Biologists:	
Personal services	120.00
Expenses	41.04
Damages by wild deer and moose59
Propagation	431.47
	\$1,993.19

ALLOCATION

PART I — ADMINISTRATION OF CENTRAL OFFICE, AND THE PROPAGATION AND PROTECTION OF FRESH-WATER FISH AND GAME

	Appropriated for 1928	Suggested appropriation for 1929
Salary of Director (Item 263)	\$4,000.00	\$4,550
Office assistants (Item 264)	10,180.00	10,310
Office expenses (Item 265)	7,500.00	8,891
Publicity (Item 266)	1,000.00	1,000
Inland Law Enforcement:		
Salaries (Item 267)	66,000.00	70,000
Expenses (Item 268)	40,000.00	50,000
Biologists:		
Salaries (Item 269)	5,100.00	6,540
Expenses (Item 270)	2,500.00	2,700
Propagation of game birds, etc. (Item 271)	99,700.00	106,000
Damages by deer and moose (Item 272, and deficiency appropriation)	11,673.26	9,000
Specials: For improvements and additions at fish hatcheries and game farms (Item 279)	10,000.00	30,000*
	\$257,653.26	\$298,991

* As indicating the great need of this amount for "Specials"—the following are listed from the Forecast. The enlargement of rearing space at our game farms is imperative.

Lands now held under lease with options of purchase in the leases are as follows. These are all parts of our plants and cannot be abandoned. We are paying annual rentals of from six to ten per cent of the purchase price.

Ayer Game Farm	\$5,000
Merrill <i>et als.</i>	1,600
George H. Thompson	600
Town of Sutton	810
Welsh family	865
Grace E. Sullivan	360
	\$9,235
Other items of immediate necessity:	
Montague Fish Hatchery:	
Complete house for superintendent	3,500
Ayer Game Farm:	
Garage	900
Brooder houses, pens and yards	3,000
Wilbraham Game Farm:	
Brooder houses, pens and yards	2,000
Marshfield Game Farm:	
Incubator house and grain room	3,000
Brooder houses, pens and yards	2,000
Purchase of camp	800
East Sandwich Game Farm:	
Brooder houses, pens and yards for pheasants	2,000
Brooder houses, pens and yards for quail	1,500
Merrill Pond System:	
(Which includes Stockwell Ponds, Sutton-Thompson Ponds and Welsh-Sullivan Ponds)	
Construction and completion of dams	3,000
Amherst Rearing Station:	
House for superintendent	7,500
(Present house to be occupied by an assistant)	
Meat house, ice house and work shop	2,000
Palmer Fish Hatchery:	
Replace wooden dams with concrete	1,000
Concrete raceways in bass ponds	350
Additional bass ponds	1,000
Sandwich Fish Hatchery:	
Additional trout ponds	1,000
	\$43,785

ALLOCATION

PART II—NON-GAME BIRD RESERVATIONS AND WILD LIFE SANCTUARIES
(Item 273 of the Budget, "Protection of Wild Life")

	Appropriated for 1928	Suggested appropriation for 1929
MAINTENANCE		
Martha's Vineyard Heath Hen Reservation:		
Salary of superintendent		\$1,500
Extra labor		50
General operating expenses		750
Replacing superintendent's car		650
	\$3,400	
Penikese Island Sanctuary:		
Salary of superintendent		1,290
General operating expenses		500
Boxford Sanctuary:		
Special patrol	Nothing	600
Edward Howe Forbush Wild Life Reservation:		
Special patrol	Nothing	600
Isaac Sprague Bird Sanctuary:		
Special patrol	Nothing	600
Minns Wild Life Sanctuary (Little Wachusett Mountain):		
Special patrol	Nothing	600
Watatic Mountain Wild Life Sanctuary:		
Special patrol	Nothing	600
SPECIALS: CONSTRUCTION AT NON-GAME BIRD RESERVATIONS AND WILD LIFE SANCTUARIES (Item 279 of the Budget.)		
Boxford Sanctuary		
Permanent wooden signs	Nothing	\$100
Edward Howe Forbush Wild Life Reservation:		
Permanent wooden signs	Nothing	100
Isaac Sprague Bird Sanctuary:		
Removal of buildings		500
Construction of dam to build fresh-water pond	Nothing	1,500
Knight Wild Life Reservation:		
Permanent wooden signs	Nothing	100
Martha's Vineyard Heath Hen Reservation:		
Repairs to superintendent's house	Nothing	200
Fix foundation to, and repair barn		250
Porch to superintendent's house		150
Minns Wild Life Sanctuary (Little Wachusett Mountain):		
Permanent wooden signs	Nothing	100
Penikese Island Sanctuary:		
Repairs to superintendent's house		\$150
Complete removal of buildings		500
Pond—fresh water for wild fowl	Nothing	500
Watatic Mountain Wild Life Sanctuary:		
Permanent wooden signs	Nothing	100
Wiring off and marking trails		200

ALLOCATION — PART II — *Continued*

	Appropriated for 1928	Suggested appropriation for 1929
Wild Life Sanctuary at East Sandwich:		
Construction of road into sanctuary from State highway, including widening dike, and culvert	Nothing	\$500
Construction of dam to form large fresh-water pond for waterfowl		1,500
Purchase of land for permanent wild life sanctuaries	Nothing	15,000
	\$3,400	\$29,190

ALLOCATION

PART III — MARINE FISHERIES

	Appropriated for 1928	Suggested appropriation for 1929
Regulating the Sale and Cold Storage of Fresh Food Fish:		
Salaries (Item 274)	\$10,740	\$11,820
Expenses (Item 275)	3,300	5,360
Coastal Warden Service:		
Salaries (Item 276)	9,300	14,700
Expenses (Item 277)	7,000	19,820
Purchase of egg-bearing lobsters (Item 278-a)	7,500	10,000
General lobster work:		
Inspection of international shipments	Nothing	1,385
Repairs to equipment (including replac- ing lobster car, new shipping barrels and locks)	Nothing	150
Collection and planting of short lobsters from international shipments	Nothing	350
Lease of store room, and coal	Nothing	94
Salt-Water Smelt Work:		
Lease and purchase of lands to control spawning grounds.	Nothing	2,500
Alewife work:		
Transplanting of alewives	Nothing	200
Maintenance of Lawrence fishway	Nothing	300
Observations at fishways	Nothing	840
Seals—bounty (Item 280 and deficiency ap- propriation)	\$450	1,000
Shellfish:		
Co-operate with U. S. Bureau of Fish- eries in studying the growth of all shell fish, methods of collecting seed, and the replanting of all suitable areas	Nothing	10,000
Collecting and returning to the water stranded scallops	Nothing	1,000

ALLOCATION — PART III — *Continued*

	Appropriated for 1928	Suggested appropriation for 1929
Re-seeding grounds open to public fishing	Nothing	\$1,000
Commercial Fisheries Laboratories:		
Salaries	Nothing	13,750
Expenses	Nothing	29,000
For directing public attention to the value of eating Sea Products	Nothing	10,000
	\$38,290	\$133,269

On November 23 a statement was sent to all the local organizations, enclosing that portion of the foregoing letter which shows the total arrears, and also outlining our suggestion for the allocation of the \$299,000 asked.

CONFERENCES WITHIN THE STATE

The regular annual conference with the anglers, hunters and those interested generally in wild life, was held at the State House on January 11. All parts of the State were represented. The recommendations for legislation to be filed by the Division were, as usual, fully discussed, and in addition many other matters of general interest relating to the conservation of wild life and the betterment of sport.

The second such conference was held on November 27, and was, in reality, to cover the legislation of the year 1929. This resulted in the holding of two conferences in one year. The reason for this was the adoption by the Director of a new plan for the handling of legislation. For several years past it has been the Director's practice to send the local organizations a list of measures upon which legislation was most urgently needed, giving his reasons for such needs in each case. The statement was accompanied by a questionnaire on which the associations were asked to register their majority sentiment for or against each proposed measure. The Director gave assurance that he would file no measure which the majority of the clubs answering did not favor.

That plan put on the Director the responsibility of being the moving agency in furthering these matters through the Legislature. Experience has shown that he should not assume the responsibility of advocating important legislation. The Director sits in an advisory capacity to the Legislature; he cannot ask its members to vote for his recommendations; and at all times he must be free from any obligations to members of the Legislature or the public at large in administering the Division. Therefore, this year he sent to local organizations a letter dealing with five major propositions upon which he felt action should be taken, namely, (1) to increase license fees; (2) to authorize the Director to appoint agents (in addition to the city and town clerks) who will issue sporting and trapping licenses without charge; (3) to prohibit all fishing through the ice in January and February; (4) to reduce the open season on cottontails and white hares to two months; and (5) to restore the public rights in natural great ponds between ten and twenty acres.

In order that these and other important questions should be fully discussed well in advance of the expiration of the time within which to file bills, the Director set the annual conference to cover the legislative session of 1929 on the above date. By this plan the local organizations and

the public at large can be most fully informed of the workings of the Division, and be best equipped to perfect any larger organization that may be desirable to further these projects.

ACTIVITIES OUTSIDE THE STATE

The Director attended meetings having to do with all phases of wild life conservation, as follows:

The annual meeting in New York City of the National Game Conference on December 5 and 6, 1927. As usual the general subject-matter of the discussions related to the artificial propagation of game birds and quadrupeds throughout the country.

The annual meeting December 8, in Washington, of the Advisory Board to the United States Biological Survey relative to regulations proposed by the Bureau of Biological Surveys affecting wild fowl. The Director is a member of this Board.

The annual meeting of the United States Fisheries Association in Buffalo, N. Y. August 1-4.

ACKNOWLEDGMENTS

Such contributions as have been received during the year are accounted for under the following funds:

Stockwell Ponds Fund

The balance of \$16.80 carried over from the previous year was expended in completing the large dam in Middle Pond.

During the year further contributions for this work were received, as follows:

Worcester County Fish and Game Association	\$42.20
Norwood Sportsman's Association	10.00
Athol Rod and Gun Club	50.00
Woodville Rod and Gun Club	10.00

\$112.20

Of this sum \$48 has been used on further work on the above dam in Middle Pond, leaving \$64.20 on hand at the close of the year.

Amherst Rearing Station Fund

Of the balance of \$1,050 on hand at the close of the last fiscal year, \$1,000 was used to purchase the Bartlett-Whitcomb tract.

During the year additional contributions were received, as follows:

Springfield Fish and Game Association	\$100.00
He Man's Club—of Granby	5.00

The foregoing contributions of \$105, together with the remaining \$50 from the previous year, were used, together with a part of our appropriation, to complete the purchase of the Clark property.

Palmer Fish Hatchery Fund

The Camp Cook Club of Ware contributed \$25 for work at the Palmer Hatchery. It was used to open up brooks which are part of the water supply, so as to increase the volume.

Montague Fish Hatchery Fund

The balance of \$153.98 on hand at the close of the last fiscal year, was used to clear out the remaining stumps on the area to be devoted to the construction of large rearing pools, and part of the cost of dynamiting a new bed for the brook in order to move it to one side of its former location, and off the area to be used for ponds.

On September 14 we received from the Franklin County League of Sportsmen's Clubs a further contribution of \$550 for the construction of the large rearing pools referred to above. Up to the close of the fiscal year \$419.75 had been used for the purpose, and there remains on hand a balance of \$130.25.

Gifts of Land

The public continues its interest in the principle of permanent wild life sanctuaries, which has been discussed in previous reports. During the year the following gift of land, to be a permanent wild life sanctuary, was received:

From the Federation of the Bird Clubs of New England, Inc., approximately 5,000 acres of land located in the town of Hancock, to be known as the Edward Howe Forbush Wild Life Reservation. (See Sanctuaries.)

Other Gifts

The balance of \$1.20 of the funds contributed by the Federation of the Bird Clubs of New England, Inc., and Isaac Sprague, Esq. for the removal of buildings from Carr Island, remains unexpended.

The balance of \$38.42 of the fund raised by the North Shore Rod and Gun Club (including contributions from Ralph S. Bauer, Esq. of Lynn and from the Massachusetts Fish and Game Association) to pay the cost of salvaging fish from Wenham Lake, remains unexpended.

The Town of Falmouth, as its contribution to the improvement of fishing conditions in that locality, paid bills amounting to \$75 for the transfer of fish by one of our salvage units from Long Pond, Falmouth, to local waters open to public fishing.

The Town of Webster helped advance the work at the Thompson and Putnam Mill Dams by paying bills to the amount of \$100 (\$36 for the former and \$64 for the latter).

ENFORCEMENT OF LAW

Among the many changes in the personnel of the law-enforcement force which must be recorded this year is the loss by death of two faithful wardens. On December 3, 1927, Warden Patrick F. McCarthy of Easthampton was overcome while fighting a fire in his town and died immediately from the effects. Warden McCarthy was a member of the Board of Fire Engineers of the town and went into a burning building with his men, where the effects of escaping gas resulted in his untimely death. He was a veteran of the Spanish American War, served as fish and game warden since 1912 and was held in high respect by his superior officers and by residents of his district.

On March 27, 1928, Warden Arthur M. Nichols of North Adams, one of the oldest wardens in this Division in point of service, died suddenly from a heart attack. Warden Nichols served the Commonwealth for twenty-eight years as warden and was highly respected by his superior officers and the residents in his district.

Because of the increased amount of work and to promote greater efficiency in the warden service, Warden Frederick W. Goodwin of East Boston was relieved from duty in the Boston district and assigned as a Field Supervisor of the warden force. Warden Goodwin's work consists of co-operating with the various wardens in their own districts and organizing and supervising special enforcement work where it is necessary to bring several wardens together for effective operations.

Warden Elisha T. Ellis of North Easton, who had been a warden for eleven years, resigned on March 15, 1928, to accept an appointment as

Chief of Police of the town of Easton. Mr. Leon E. Myatt of Attleboro, who had served many years as an unpaid deputy, was appointed to succeed him.

On April 1, 1928, Warden Edward E. Backus of Ayer was promoted to the position of Superintendent of the Ayer Game Farm. Mr. Lloyd M. Walker of Maynard, who served as fish and game warden for that town, was selected to succeed Warden Backus in the Ayer district.

Under authorization received from the Legislature two additional wardens were added to the inland warden force in the persons of Mr. Oscar L. Cregan of West Brookfield and Mr. Arthur J. Loveley, Jr. of Lancaster. Warden Cregan has been assigned to the district around North Grafton. Warden Loveley has not yet been assigned to a district and is engaged in special law-enforcement work. Both men formerly served as deputy wardens.

One change in the coastal warden service was made through the resignation of Warden Ernest C. Cloon of Lynn to accept a position as Food Inspector in the Department of Public Health. Mr. Henry M. Parlee of Lowell, who served for many years as a deputy warden, was appointed to the coastal warden force in his place.

Authorization was received from the Legislature to add two permanent wardens to the coastal warden force, and this was done by the appointment of Deputy Wardens Stephen W. Jenkins of Danvers and Holger G. Smith of Bridgewater to the permanent coastal warden force. These men were assigned to the enforcement of the shellfish laws in and around Boston Harbor.

The law-enforcement work proceeded during the year with little, if any, variation from past years. While the court record for the year is practically the same as for the previous year, yet it is fair to say that the law-enforcement work was carried on more vigorously than in the past. The lack of a greater number of cases is due largely to the fact that there were several changes in personnel in the force during the year, and, as may be expected, it has taken the new wardens some little time to become acquainted in their districts.

The warden force is now equipped with a first-class motor vehicle fleet, as twenty-two cars were purchased during the year. This gives each man a car with which to operate through his district. In addition to this a large percentage of the force has been equipped with trailers, boats and outboard motors, increasing their efficiency for patrol work both on the coastal and inland waterways.

The law provides that each city and town may request the appointment of a local fish and game warden, yet only fifty cities and towns throughout the Commonwealth took advantage of this law throughout the year. This is one way in which the cities and towns can aid in the enforcement of the fish and game laws in their localities, but this form of co-operation has been noticeably lacking.

While there was a lack of requests for the appointment of town and city fish and game wardens there were many applications for appointment as unpaid deputy wardens, and approximately 250 men served in this capacity during the year. Some of the deputies have done splendid work during the year, but the percentage of such was extremely low, and as a whole the record of this volunteer force is far from satisfactory.

The court work for the year was as follows: Number of cases, 1,271; convicted, 1,179; discharged, 92; (filed, 168, appealed, 75); fines imposed, \$15,594. In addition to the penalty imposed by the courts, each person convicted loses any sporting license or trapping license which may have been issued to him, together with his right to secure a license within one year following date of conviction. Licenses revoked: resident citizen sporting, 274; non-resident sporting, 1; resident trapping, 53; alien trapping, 2; alien sporting, 7; minor trapping, 5; resident lobsterman, 2; alien lobsterman, 1; total, 345.

The fact that of the 1,271 cases prosecuted, only 92 were discharged, indicates that only bona fide cases were brought to court, and that in practically every instance the wardens had sufficient evidence to convict. Of the cases where convictions were secured 168 cases were placed on file, but that disposition indicated that there was justifiable cause for bringing the defendants to court. A total of \$15,594 was assessed in fines against these violators, but the total amount of money which was paid into the treasury of the Commonwealth as a result of fish and game cases was substantially less than this figure, due to the fact that a number of these cases are still pending on appeal in the Superior Court, and further because in some cases where an appeal was taken, the smaller fine was imposed when the case was finally settled in the Superior Court. The above figures refer to the amount of money assessed upon convictions in the district courts throughout the State.

Outnumbering all other classes of violations is that of fishing in inland waters without a sporting license. During the year many of these violators were apprehended and prosecuted. This form of violation continues from year to year, despite the efforts of the wardens to stop it through continuous prosecutions. The general public does not seem to realize the requirements of the law in this respect, nor does it realize that the maintenance of the inland fisheries of the State depends on the amount of revenue obtained from sporting licenses. The major portion of the money expended for propagation work is devoted to the operation of fish hatcheries, and the scope of that work is dependent upon license fees. A sporting license is required today on practically every inland fishing water, and prosecutions will continue without fear or favor until the public realizes that sporting licenses must be purchased before these waters may be fished.

The offence of hunting without a sporting license is also a serious consideration, although the number of these violations does not compare with those mentioned above. While 103 persons were prosecuted for hunting without a license, a total of 264 were prosecuted for fishing without a license, indicating that there is a much greater tendency to ignore the law requiring a license to fish in stocked waters.

The next important class of violations was those having to do with the taking of shellfish on the contaminated coastal areas, and during the year 171 persons were prosecuted for thus taking shellfish, and fines totalling \$2,425 were assessed against them. As far as the limited coastal force (which comprised only 5 wardens up to October 15, when 2 additional men were appointed) was able to do, much effort was made to stop the public from digging on these areas.

Much of the time of the wardens, particularly those in the western part of the State, was taken up with the work of the appraisal of deer damage claims which has become one of the functions of this Division. On September 5 a new law became effective relative to the appraisal of these claims, and at that time a change was made in the system of appraising claims as far as the warden force was concerned. In the future one warden will handle all of the deer claims in his county. By centralizing this work in one man in each county, he will naturally become more efficient in handling it.

While some taking of shellfish on the contaminated areas continues in certain parts of the State, particularly in the vicinity of Boston and Lynn Harbors, there was an improvement throughout the State in the observance of this law.

The members of the coastal warden force have devoted much time in co-operating with the State Department of Public Health in its experimental work on the transplanting of shellfish from the contaminated areas into clean waters where they are allowed to purge themselves. The major part of this work was carried on in the vicinity of New Bedford and Fairhaven, where the district coastal warden had fifteen special deputies under his supervision to see that the regulations of the State Department of Public Health concerning this experimental work were adhered to.

On July 25 a law became effective under the terms of which the Director was authorized to purchase egg-bearing lobsters from the fishermen. This

work was handled by the coastal warden force with the co-operation of several prominent lobster dealers throughout the State, who willingly assumed the task of purchasing these lobsters from the fishermen out of their own funds. The coastal wardens collected and marked these lobsters by punching a hole in the middle flapper of the tail, and liberated them in the localities where they were originally taken.

NEW LEGISLATION

The following changes were made in the fish and game laws during 1928:

Chapter 8, Acts of 1928, amends section 35 of chapter 130 of the General Laws and restricts the use of more than ten hooks in any inland water. Previously the law applied only to ponds.

Chapter 20 amends section 26 of chapter 131 and penalizes the possession as well as the killing of the birds mentioned.

Chapter 21 amends section 105 of chapter 131 relative to the revocation of lobster licenses, and provides that a lobster license shall be revoked for a second conviction for violation of any fish and game law within a period of three years. Heretofore a license was revoked only for certain specified violations of the lobster laws.

Chapter 24 amends section 57 of chapter 131 and penalizes the netting or snaring of any birds, whether protected by law or not. The previous law covered only protected birds.

Chapter 35 is a special law relative to the use of trawls in certain sections of Buzzard's Bay.

Chapter 40 relates to the enforcement of the fish inspection law and makes a few minor changes to improve its enforcement.

Chapter 72 increases the penalty for the illegal killing of quail, making a minimum of \$20 and a maximum of \$50.

Chapter 74 amends the law relative to the special restrictions on the Deerfield River, extending them to the entire river where heretofore they applied only to the section from Shelburne Falls to the State line.

Chapter 113 amends section 80 of chapter 130 and provides that no person may take scallops by hand for his own family use unless he has a permit from the local authorities to do so.

Chapter 131 amends section 98 of chapter 130 relative to the issuance of permits for the sale of lobster meat and provides for a fee of \$10 for such permits.

Chapter 170 amends section 7 of chapter 21 and increases the maximum salary for the town fish and game wardens from \$100 to \$200.

Chapter 177 extends for two years a closed season on quail in Essex, Hampden, Hampshire, Middlesex, Nantucket, Norfolk and Worcester counties.

Chapter 178 provides a closed season on ruffed grouse during 1928.

Chapter 215 amends the law relative to the open season on deer, providing for an open season of two weeks instead of one. The bag limit and other restrictions remain the same.

Chapter 220 amends section 58 of chapter 131 by providing a penalty for the possession of furs which have been taken by the use of poison.

Chapter 263 provides for the purchase of egg-bearing lobsters by the Director, and increases the lobster license fee to \$5.00. The new license fee becomes effective January 1, 1929.

Chapter 266 amends section 138 of chapter 130 and includes the word "digs" in addition to the taking of shellfish from the contaminated areas. This is to meet the objection of some courts which held that the digging of shellfish was not a violation of the previous law unless the shellfish were transported from the area.

Chapter 269 is a new law relative to the transportation of shellfish.

Chapter 271 repeals section 39 of chapter 131 and provides that the Commissioner of Conservation may establish the open season and regulations on shore birds, rails, jacksnipe, coots and gallinules.

Chapter 323 is a new law under which cities and towns may operate plants

for the purification of shellfish taken from the contaminated areas under the general supervision of the Department of Public Health and this Division.

Chapter 361 amends section 67 of chapter 131 and devises a new system for the appraisal of deer damage claims. All claims over \$20 will be appraised by three men, one appointed by the owner, one by the county agricultural trustees, and, the third by the Director of this Division. Claims under \$20 will be appraised by the chairman of selectmen as at present.

Chapter 17 of the Resolves provides for an investigation as to the advisability of establishing a fish rearing station in Essex County.

Chapter 44 of the Resolves provides for the appointment of a special unpaid commission of seven persons to investigate the entire shellfish situation and industry.

RECOMMENDATIONS FOR NEW LEGISLATION

Recommendations to the general court of 1929 for changes in the fish and game laws will be found at the end of this report.

EDUCATION AND PUBLICITY

We are fully alive to the benefits resulting from a systematic campaign of informing our people on the theory and practice of wild life conservation, but the pressure of work has made it impossible to accept many invitations to appear before local organizations to discuss these problems. There are now some 250 local fish and game clubs. It is impossible to attend all of the annual meetings of these organizations, let alone cover the many requests from other groups. However, during the past year, by a rearrangement of the law enforcement work, Chief Warden Bourne covered a larger number of assignments than has been possible for some years past.

The exhibit at the Eastern States exposition in West Springfield has become an annual affair, and this year was set up along the usual lines. Exhibits were also made at the Franklin County Agricultural Society's fair at Greenfield, at the fair of the Worcester Agricultural Society at Worcester, and several pens of pheasants shown at the exhibit of the Brockton Agricultural Society at the Brockton Fair.

Through releases to the press and special articles we continue to keep the public informed of the work in general. There were also distributed some 10,000 reprints of an article published in the *Boston Transcript*, explaining to the fishermen and hunters how the law works with regard to fishing rights, and our method of fish and game distribution.

BIOLOGICAL DEPARTMENT

FIELD WORK

Little that is new can be said concerning fishways. With one or two exceptions all of the important coastal streams are now open to the sea.

Adult alewives were collected from two of the more flourishing fishways and used to restock old breeding grounds.

A considerable amount of time was given to inspecting the pheasant pens and rearing pools in which the local sportsmen's associations and chapters of the Izaak Walton League of America are rearing State birds and fish.

Frequent visits were made during the breeding and rearing seasons to the game farms and fish hatcheries to inspect the stock and arrange for discarding brood stock, and adding new blood for improving the following year's production.

DISTRIBUTION

The annual movement of the large stock of fish and birds produced at the fish hatcheries and game farms involves a great amount of detail and requires a large amount of the time of the biological department. Not only must this stock be moved, but it must be apportioned equally over the entire State to the sections which have been found, after careful investigation, to have the proper waters and cover. In addition to this, there is a large amount of work in entering on the office records the details of its liberation and planting.

Special consideration is still being given to the stocking of all natural great ponds of twenty acres or over. At the close of this year, all ponds within this category have received plantings of fish.

Special groups of white perch and small mouth black bass ponds are still being selected annually for stocking.

A large number of private ponds were stocked after the receipt of a written agreement from the owners or controllers of the water rights.

Several ponds were stocked and closed to winter fishing, and a breeding area was set aside in one of the larger of the great ponds in the State. (See Inland Fisheries—Ponds.)

Additional clerical assistance supplemented the office force in collecting information on all the inland waters of the State. These can roughly be classified into (a) natural great ponds of 20 acres and upwards; (b) natural great ponds between 10 and 20 acres; (c) reservoirs and natural great ponds which are used as municipal water supplies; (d) privately owned ponds; and (e) streams and rivers.

The information that has been collected in other departments on these waters was consolidated with our own records, and we are now engaged in classifying this material. In this connection we should point out that the status of many waters still remains to be determined. In some instances natural great ponds of twenty acres and upwards have been greatly enlarged through the construction of dams and by flowage. In many instances it still remains to be determined whether such waters are natural great ponds though increased by flowage, or whether they are merely artificial reservoirs. Much work still remains to be done to complete the biological survey of all State-owned ponds of 20 acres and upwards.

FISH AND BIRD DISEASES

In addition to the many routine pathological examinations of diseased fish and birds received from time to time for autopsy, any abnormal conditions discovered among the stock at the stations or in the field were studied and treated.

In August an epidemic of coccidiosis attacked the young pheasants at the Wilbraham Game Farm, for details of which see the station report.

WILD BIRDS AND ANIMALS

WINTER FEEDING

Owing to the open winter practically no feed was distributed for feeding the wild stock.

BREEDING SEASON

The breeding season was cold, with wet weather, continuing late. Taken as a whole it was unfavorable.

FIRES

The absence of drouth conditions made it unnecessary to consider closing either the trout fishing season or the hunting season.

POSTED LAND

The total volume of posted land has remained about the same in recent years. In a given year a substantial area may be posted in some one town. This movement usually wears out in time, with a similar activity arising somewhere else. Our land owners continue their democratic attitude of permitting the public to hunt and fish over their properties—a condition which is becoming more and more appreciated by our hunters and fishermen. In this connection we are renewing our request of last year for more authority to our wardens, so that they may give increasing protection to the land owners.

MIGRATORY BIRDS

Song and Insectivorous Birds

There was little increase in the number of permits now outstanding for the collection of birds, eggs and nests for scientific purposes. Seventy-seven

permits were issued. On the basis of the reports (of which 73 were received) 183 birds and 468 eggs were taken.

Our wardens have apprehended a number of violators in the act of destroying eggs or the birds of those species. We will continue our efforts to give them increasing protection.

Migratory Game Birds

Shore Birds.—The Federal regulations continue a close season on all species of shore birds. Owing to the absence of gunning it is natural that the birds will proceed more leisurely on their summer and fall migrations. It is quite usual for them to linger in a favorable area if not driven out by hunters. As a result it is unwise to draw too hasty a conclusion that there has been a substantial increase by reason of the larger numbers seen; but, taken as a whole, it is safe to say that these birds are showing a gradual increase.

Plover.—Both the spring and the fall migration indicated an increase in the black breast plover. In several localities a larger number than usual of golden plovers was reported. The upland plover is not more than holding its own, and only a few breeding pairs are found in any one locality. The piping plover breeds on limited areas, and its status remains unchanged.

Snipe.—The spring migration was usual. The fall migration brought in more than the average numbers of birds. In some parts of both the North Shore and the South Shore and in the low lands along some of our rivers, better shooting than usual was afforded.

Woodcock.—More than the usual number of breeding birds was reported during the early spring and breeding season. It is remarkable how these birds adjust themselves to the cold, wet, unfavorable conditions of the average breeding season.

The fall flight was heavier than has been known for many years, and it was quite generally spread out over the entire State. While the season opens on October 20 and there are few observers in the covers prior to that date, the indications are that the flight arrived this year at about the time of the opening of the season and was particularly heavy during the first three days, although in some localities the birds were reported numerous as late as the early part of November.

Rails.—The season on rails was changed to open at the same time as the duck season, thereby eliminating the excuse for rail hunters to be on the duck grounds before the opening of the duck season. Rails continue to hold their own, and more were reported in various places than usual.

Sandpipers.—These birds continue to show an increase.

Winter and Summer Yellowlegs.—There was a good spring flight of both species. The summer and fall migrations were much heavier than has been the case for several years.

Curlew.—There is an increase in this species, although it is proceeding slowly.

Ducks.—More than the usual number of wood ducks were reported in the localities which are still favorable for them. These are the wooded areas in the swamps along some of our larger sluggish streams.

Mallard, teal, pin tail and canvas back ducks are reported annually, but do not make up a large percentage of the ducks taken.

The spring and fall flights of red heads and blue bills continues sub-normal, based on the observations of recent years.

The black duck registered a slight increase; but this is relatively small as compared to what could be the case were there an adequate number of proper wild life sanctuaries scattered along our coast and at various points inland.

Geese.—From December 1, 1927, to the close of the season the movement showed an increase over the preceding year.

The spring flight was without special incident.

The fall flight started early, and up to the close of this report (November 30) the geese were moving along in good numbers. The steady, warm, blue-

bird weather of the average fall was present until the latter part of November, when several quick changes in the weather started the birds along.

The spring flight of brant was without incident. In October there were several days when they flew in large numbers, but the rather steady flight of previous years had not taken place up to the close of this report. However, the birds had moved along sufficiently to provide some sport in the special brant areas (such as the waters off Monomoy and in the regions around Tuckernuck and Muskeget).

Statistics of the Gunning Stands.—Number of stands which reported, 124; geese shot, 3,839; ducks shot, 10,660; live goose decoys used, 5,091; wooden goose decoys used, 3,816; live duck decoys used, 3,777; wooden duck decoys used, 2,932.

Migratory non-game Birds—Gulls and Terns

The gulls and terns bred on about schedule time in the spring and had to run the course of another unfavorable breeding season. But these species, taken as a whole, appear to be holding their own and in some localities are registering an increase. The additional consideration that these birds are now receiving through the maintenance of several sanctuaries is beginning to show results.

Federal Control of Migratory Birds

The Migratory Bird Bill, which has been before the Congress of the United States for some years, was finally passed by the Senate at the last session. It was so altered and amended as to leave little of the original bill. It now becomes known as the Migratory Bird Conservation Act (popularly known as the "Norbeck Bill" in honor of Senator Peter Norbeck of South Dakota, who for several years has given it his undivided attention and oversight in the Senate.) The provisions for establishing public hunting grounds and for financing the measure by a Federal hunting license, have been eliminated. In its present form it is a straight bill asking for an annual appropriation of a million dollars to establish inviolate sanctuaries.

At the annual meeting of the International Association of Game, Fish and Conservation Commissioners, the bill was very fully discussed, and a committee, national in its scope, was selected to father the bill at the next session of Congress. There has been a decided tendency on the part of factions interested in this legislation to submerge their individual differences of opinion and get together on the present measure, with some modifications which can undoubtedly be worked out on a give-and-take basis. It appears now that there is more likelihood of making a start on the establishment of large sanctuaries for the maintenance of breeding and wintering areas, than has been the prospect in some years.

UPLAND GAME

The Hunting Season

The arrival of timely rains removed any necessity for considering the closing of the hunting season on account of drouth. From the opening day, October 20, up to within a few days of the close on November 20, the weather continued warm with little rainfall. While the days were pleasant, as a rule they were too warm for either the hunter or his dogs. However, very few days out of this short season were a total loss because of weather conditions.

Pheasants.—Before the opening of the season pheasants were reported in substantial numbers over most of that portion of the State which can be fairly considered pheasant country. The pheasant will not stay in the heavily timbered sections, preferring the open country where it can have upland for feed and range, and swamps for roosting and retreat. But with the arrival of the shooting season the birds seemed, in the opinion of the average hunter, to fade away. This may be due to the fact that by reason of our long open season, these birds have learned to get out of the way in short order. At any rate, the average hunter does not have the advantage of a good dog and is reluctant to go into the heavy swamps where the larger numbers

of pheasants are found. Every year we receive reports of a scarcity in certain localities during the shooting season, only to have them reported in numbers after the season closes and things quiet down.

The fact remains, however, that if we are going to increase sporting opportunities with this bird we must increase its numbers.. The average hunter who pays \$2.25 for a license does not realize that if he kills but one cock pheasant in a season it would cost him twice the amount he pays for his license to put that bird back into the covers alive. There are over 120,000 purchasers of sporting licenses. If we assume that half of them hunt, and if this half killed but one cock pheasant each in a season, it would require 60,000 birds to go around. This should give the rank and file of our hunters some appreciation of the problem of supplying an adequate number of game birds of any species to provide even a modicum of sport.

The total number of pheasants reported shot in open season was 1,914, divided according to counties as follows: Barnstable, 23; Berkshire, 38; Bristol, 145; Essex, 270; Franklin, 73; Hampden, 199; Hampshire, 157; Middlesex, 344; Norfolk, 154; Plymouth, 180; Worcester, 331.

Ruffed Grouse.—In our last report (ending November 30, 1927) we could discuss the status of the grouse only as based on the breeding season and the reports from hunters in the open season and for the ten-day period following it. We stated that an alarming scarcity of these birds was reported from all sections of the State. During the late fall and early winter we canvassed the situation closely and concluded that the only safe course was to ask for a close season this fall. It is to the great credit of our sportsmen that they were practically unanimous in agreeing to this plan. The bill was enacted and the grouse were given a year's protection.

The breeding season was not favorable and the numbers of birds reported in the fall confirmed the wisdom of giving them a respite this year. However, reports from hunters in various parts of the State indicate that a good breeding stock was carried over in many localities. We hope that history will repeat itself and that the birds will regain their normal numbers as rapidly as was the case after the closed season of 1919.

The New England Ruffed Grouse Investigating Committee continues its work. More data has been added to that previously collected, and while there were no outstanding discoveries, the information collected will be helpful in rounding out an investigation which, to be of value, should continue with increasing intensity over a period of years.

Quail.—On the quail range in the southern part of the State the birds continue to hold their own. In those eastern counties where a close season has been maintained for a number of years there was a larger increase reported than has been the case for some years. In previous reports we have spoken of the apparent failure of the birds to respond to this protection; but this year there is encouraging sign that they are showing some increase and spreading out into new territory. We have been very fortunate, during the past several winters, to have no storm that could be classified as a "killer."

Deer.—The one week of open season (December 5 to 10, 1927) saw a kill of 1,969 deer. Of these 1,062 were bucks and 907 does. They were divided by counties as follows: Barnstable, 252; Berkshire, 440; Bristol, 37; Franklin, 400; Hampden, 294; Hampshire, 157; Middlesex, 22; Norfolk, 10; Plymouth, 89; Worcester, 252; locality not reported, 16. The season was an average one, being about as favorable for the deer as for the hunters.

Deer shot while damaging crops numbered 85.

There were brought over into 1928 and paid, 100 claims filed in 1927 amounting to \$3,973.15, but which could not be settled in that year on account of lack of appropriation. There were received in 1928 141 claims, which were approved and paid in the amount of \$5,754.85. There were also received 35 claims which will be approved and paid within the coming fiscal year.

The law was further changed by providing a different method for the appraisal of damages by deer, effective September 5. By its terms the ap-

praisal is to be made by three appraisers, one to be selected by the owner of the damaged property, one by the Board of Trustees for County Aid to Agriculture (in the county where the damage occurs), and the third by the Director. Compensation for time and travel is to be paid to the appraiser for the owner, and in certain cases to the appraiser appointed by the trustees. Time alone will show whether this method will result in any more accurate appraisal of the damages than has been made in past years. The feature requiring the final approval of the Director on all claims before payment is retained.

Indications are that the total number of claims for deer damage is steadily increasing. At the present time, and despite our protests, the appropriations for these claims are included as part of the appropriation of this Division to do the things of benefit to the anglers and hunters. We continue our contention that a system should be devised for having these appraisals made entirely by experts, and that the damages should be paid by funds raised by general taxation. Recently we have made a rather superficial inquiry as to posted land, and we find that at least 180,000 acres are posted. This does not include the many large tracts which are watersheds around our municipal water supplies, nor certain other large projects such as the proposed watershed around the reservoir which is being built on the Swift River system. This alone will include upwards of 160 square miles. We believe that at least a million and a half of our people are interested in the preservation of the deer as well as the hunters who have a short open season.

While we have discussed this fully in our letter to the Budget Commissioner in the first part of this report, we repeat—that where the maintenance of a stock of desirable wild life conflicts with one of our industries, whatever damage it is deemed proper to pay should come out of the general tax levy, for the maintenance of a wild life stock is desirable for all our people.

By reason of the increase in the claims for deer damages it was considered advisable to extend the open season to include the first two weeks in December instead of the one week of open season which has prevailed so many years.

Squirrels.—Squirrel shooting is limited to a very small proportion of our hunters, and there is relatively small interest in this sport. The gray squirrel seems to be slightly on the increase. Disappearance of much of its food supply over portions of the State have taken squirrels out of regions where formerly they were fairly abundant.

Hares and Rabbits.—There is little change in the status of these animals. We have recommended the sportsmen a fifty percent reduction in the present open season. We repeat that there is no form of upland game in the United States which will stand our present open season on this species.

We have been requested by our rabbit and hare hunters to do more for them in restocking. The range of the white hare is limited, and there are many sections entirely unsuited to it. We are importing from Maine a substantial number for annual liberation. The only supply of cottontails is in some of the western states, and the presence there of the disease tularemia makes it inadvisable for us to import stock for liberation. Up to the present time we believe that Massachusetts is free from this disease, and we should remain alert to keep it so.

Fur-bearing Animals.—The returns for the calendar year 1928 (the law requires the report to be made for that period) are as follows: muskrat, 49,260; mink, 1,118; skunk, 10,446; red fox, 2,023; gray fox, 162; cross fox, 1; raccoon, 750; weasel, 924; otter, 33; total, 64,717. The foregoing covers the reports of 1,856 trappers.

ENEMIES TO GAME

Cats

There is a growing appreciation of the reduction of our desirable wild life by the wild hunting house cat. The sentiment in favor of reducing the numbers of these predatory cats is slowly but surely increasing. It may be years before our people will come to the point of taking hold of this problem

firmly, and devising ways and means of eliminating these homeless wild hunting cats from our countryside; but it seems in this case (as in many others) that the ravages must assume alarming proportions before the public will be sufficiently interested to act. We believe these cats are one of the greatest destructive factors operating in our covers today. During the year the county treasurers paid out \$1,130 in bounties on 113 wild cats, for which they were reimbursed from the Treasury of the Commonwealth. Wild cats appear to be on the increase, and they are especially destructive to all forms of small game as well as deer heavy with fawn in the early spring.

Hawks, Owls and Other Vermin

While these predatory species were reported to some extent through the past winter, there was no such visitation as occurred in the previous year. While we favor devising ways and means of reducing certain of these species to a harmless minimum, we do not believe in extermination. Some day the principles of game administration will be sufficiently understood by our people so that adequate funds will be supplied to permit of a systematic control of all predatory animals.

RESERVATIONS

Martha's Vineyard Reservation

Dr. Alfred O. Gross of Bowdoin College, Brunswick, Me., has continued his scientific study of the heath hen, and we have continued to rely on his recommendations. He made his annual investigation in the spring, and his report dated April 27, 1928, to the Federation of the Bird Clubs of New England, Inc., which covers the subject thoroughly, is quoted here:

"This report of the status of the Heath Hen on Martha's Vineyard is made under the auspices of the Federation of the Bird Clubs of New England, Inc. It is based on daily reports received throughout the year from Mr. Allan Keniston, superintendent of the Heath Hen Reservation, and a personal visit made to the Island during April 5 to 9 inclusive. In making the census I was assisted by Mr. Thornton W. Burgess of Springfield, Massachusetts, Mr. O. S. Pettingill, a student of ornithology at Bowdoin College, and the wardens stationed on Martha's Vineyard. In addition to our own observations we interviewed members of the local Heath Hen Committee of the Martha's Vineyard Rod and Gun Club, various sportsmen, doctors, telephone linemen, forestry men, and others who frequently traverse the interior of the Island and are thus in a position to know of the existence of any birds. To supplement these interviews 50 circular letters were addressed to persons we were unable to see personally while we were on Martha's Vineyard.

"The weather during the census was ideal for seeing a maximum number of birds. All of the places where birds have been seen or reported in recent years were visited. The maximum number of birds seen in one group, during the census, was three on the farm of James Green near West Tisbury and also in the vicinity of four corners of the Dr. Fisher Road. These places are near to each other and the birds easily fly back and forth. *The various places were visited simultaneously by those taking the census and at no time did we find a total exceeding three birds.* If three heath hen were seen at the Green farm, there were none at the Dr. Fisher Road, and *vice versa*. The three birds observed were males, and no females were noted. During the winter a maximum of seven birds was seen at the farm of James Green, but this flock has dwindled one by one until reduced to three birds. Birds were reported, during the year, from other places, such as the Thompson farm, but never on the same day when the birds on the Green farm were all accounted for. As in past years, birds were also reported, during the year, especially during the fall, at places remote from Mr. Green's farm, but the wardens and others were unable to verify these reports. Two broods of young heath hen were *reported* as seen during the summer. An inquiry made of these reports strongly indicates that they were broods of ruffed grouse (partridges) rather than heath hen. Broods of ruffed grouse were seen where the heath hen were reported. Ruffed grouse and also quail are frequently mistaken

for heath hen even by persons resident on the Island. As an example, an excellent picture of a ruffed grouse was given in good faith to the editor of the *Vineyard Gazette* as a picture of a heath hen. There is little wonder that the birds are frequently confused in the field.

"In my report to the Federation for 1927 I stated as follows:

"We were able to account for 13 birds and there are today probably less than 30 birds on the entire Island, how much less it is impossible to state. The largest number of birds seen at any one time was ten on the farm of James Green near West Tisbury. We also noted, but never on the same day, 3 birds at the Thompson Farm, 3 on the Dr. Fisher Road, 3 on the reservation, and 2 on the "Red Valley" or Bowker Road. If we should include all of these numbers, it would total 21 birds, but it should be emphasized that all of these places are within easy range of each other and a careful study of the records clearly indicates them to be duplications with the possible exception of 3 birds on the Dr. Fisher Road. During the winter all of the birds were concentrated on the Green farm and there were never more than 13 birds. In the spring when the birds began to appear at other places the Green flock dwindled correspondingly, making it obvious that the birds were dispersing from that one place. Birds were reported from five other sections of the Island but we have no evidence of their existence there other than the word of the person who reported them. A diligent search by the wardens and also repeated visits to the localities by those taking the census failed to verify the reports." (From the 1927 report to the Federation of the Bird Clubs of New England, Inc.)

"In comparing the census of 1927 with that taken this year it is at once apparent that there is a decrease in the numbers of birds. The great majority of the people interviewed in person or by letter are firm in their belief that the small group of three heath hen at Green's farm and vicinity represents all that remain. We all hope there are more than three birds left in the area of scrub oak plains but certainly all will agree that the heath hen is now at a lower level than at any time during its history.

"In 1925, when an estimate of 25 was made, only three birds were seen, but the weather conditions at that time were unfavorable for taking a census. Fewer people were interested in reporting heath hen at that time, whereas a sight of a heath hen today is an event to be reported at once and if verified is counted. Furthermore, 30 birds were seen at one time during the winter of 1925, whereas the maximum number seen during the past winter was only 7 birds.

"It is apparent that, with minor fluctuations, there has been a steady decrease since 1920, when 600 birds were the numbers estimated to be on the Island. This decrease has continued in spite of the combined efforts of the State, the Federation of Bird Clubs, and a local heath hen committee to save them from extinction.

"Last year it was recommended to discontinue the support of the special warden, Mr. Edward F. McLeod, since the Federation was convinced the State was doing all that could be done to protect the few birds that remain. Mr. Allan Keniston, superintendent of the Reservation, has submitted daily reports of his activities, including localities visited, names of persons interviewed, number of vermin killed, number and location of heath hen seen, and a general description of the day's work. Through this co-operation we have been able to keep in close touch with the heath hen situation at all times. In addition to Mr. Keniston the Division of Fisheries and Game has placed Mr. Karl Eckert on the Island to aid in general law enforcement. At the suggestion of the Federation the Division of Fisheries and Game took active steps to have nearly 3,000 acres of the Martha's Vineyard State Forest, practically all of the area now occupied by the heath hen, set aside as additional sanctuary. This action is of importance as it prevents the disturbance to the birds caused by shooting during the rabbit season. In the past I am told there was opposition to this action but now even the rabbit hunters strongly favor this action since they seem convinced of the importance of saving the heath hen. No one interviewed this year stated they

would be glad to see the heath hen go. On the contrary every one seems most desirous of having the birds protected. Unfortunately this attitude towards the birds and the active interest of a local heath hen committee is somewhat belated.

"The State Department has put into effect every recommendation made by the representative of the Federation which would serve as an aid to save the heath hen. Mr. Keniston has carefully patrolled the region inhabited by the heath hen, he has provided food for the birds, maintained trap lines throughout the year, and continued in his efforts of general vermin control.

"The stomach contents of the cats and hawks have been shipped to Bowdoin College for examination. The results of this work, contrary to our expectations, revealed but little of the remains of birds. It is a question if the wholesale slaughter of hawks whose chief food consist of rodents may not in the end so upset the balance of nature as to act as a boomerang to the heath hen. The number of rodents, in spite of the great numbers that are killed, are very abundant in the interior of the Island today. Furthermore, under normal conditions the hawks and cats would tend to eliminate the diseased and weakened birds first, which actually works out to the benefit of the species. We believe it is well to control hawks and cats on Martha's Vineyard, but it is also evident that greater importance has been placed on the killing of such predatory animals and birds than it deserves. Quail, which live in the same environment and under the same conditions on Martha's Vineyard, have greatly increased, whereas the heath hen have been steadily decreasing. It is obvious that other factors such as disease are playing a more important role in the decline of the heath hen. As has been pointed out in previous reports, the condition of excess males among the heath hen is very detrimental to the species. Furthermore, when a species becomes so greatly reduced in numbers as is the heath hen today, sterility, excessive interbreeding, and lack of sexual vigor play an important part, but these are factors over which we have no control.

Disease

"It is now well established that disease has been an important factor in the decline of the heath hen. "Blackhead" and also "Dispharynx" have been discovered to be the cause of the death of adult heath hen. According to Dr. E. E. Tyzzer of the Department of Comparative Pathology, Harvard Medical School, the presence of "Blackhead" in an adult heath hen is presumptive evidence that it is very destructive to the young. In the past turkeys were extensively raised on the Island until "Blackhead" made the business unprofitable. It is well known that poultry may act as carriers of disease and yet not be killed by it themselves. Herein lies one of the great difficulties in controlling this important factor. The heath hen have the habit of congregating about the open fields, usually near farmyards, where they come in close contact with poultry. Although there are no heath hen on the Reservation this year, the State Department removed all poultry from the reservation in 1927 and thoroughly fumigated the premises where poultry had been kept. If heath hen should reappear on the reservation, the danger from this disease will be reduced to a minimum in that part of their range. Unfortunately the chief remaining group of birds frequents the farm of James Green, where the birds feed in an open field near the barn, where every opportunity is offered for the birds to become infected through the droppings. Last fall as many as 9 and during the winter a group of 7 heath hen were regularly seen in this field, but this flock has been reduced one by one until this spring only three visit this favorite feeding and "booming" field. We have no way of knowing what happened to the other birds, but I am told that when the group was reduced to 5, one bird kept apart from the others, appeared sick and droopy, and very soon failed to appear. This case is suggestive of what may have happened to the others. In 1921, when there was a rapid decline in the numbers of birds, 5 heath hen were found dead or else in a greatly weakened and emaciated condition so that they could not fly. A sick and helpless individual was found in the fall of 1922

and another by Charles Barrett in the fall of 1924. These cases, together with the fact that both "Blackhead" and "Dispharynx" have been found to be the cause of death of adult heath hen, emphasize the importance of disease in the recent decline of the birds. "Dispharynx" is a small parasitic worm which first becomes established in the walls of the proventriculus and in advanced cases of infection works into the muscular walls of the gizzard. This parasite has proved very destructive to the ruffed grouse, especially in Southern New England. A ruffed grouse trapped by Mr. McLeod and another found dead by Mr. Allan Keniston were infected with "Dispharynx," further indicating the prevalence of this parasite among the birds of the Island. If the natural resistance of the heath hen were reduced by a series of unfavorable conditions, disease would quickly claim the few that remain.

"The State Division of Fisheries and Game up to April 1, 1928, has expended \$63,982.36 in maintaining the Heath Hen Reservation to preserve the heath hen. In spite of this great expenditure of funds and the discouraging aspects of the problem, the State has signified its intention to continue its efforts to preserve these birds, and the reservation will be maintained even after such a time as the heath hen may seem to have become extinct.

"The local heath hen committee of the Martha's Vineyard Rod and Gun Club, though requested, have not as yet submitted a report of their activities.

ALFRED O. GROSS."

Since the time of the investigation by Dr. Gross but few heath hens have been seen. Throughout the summer the superintendent reported observing no heath hens, except one on June 21 near the fire tower. On October 17 Marshall Norton saw one heath hen on the farm of James Green, and on October 28 two were seen by Mr. Green.

There were no destructive fires in any part of the heath hen range.

The birds had the same unfavorable breeding conditions as were reported for other species. No young heath hen were reported by any one.

The superintendent continues to follow the policies worked out by the Division and Dr. Gross, in order to maintain conditions on the reservation as favorable as possible for any heath hen which at any time in the future may come to it. He continued trapping through the year, and collected the following vermin: 45 cats, 11 crows, 4 hawks and 22 rats. In addition, he killed, at the request of town and farms people, at least 15 cats known to be bird killers.

Penikese Island Sanctuary

Penikese Island was operated again this year as a wild life sanctuary.

The caretaker's daily report showed that more ducks and geese visited the island during their migration than ever before. The usual live duck and geese decoys were tethered on various high projections on the island, and a good supply of grain was available at all times for wild life visiting the sanctuary.

The first terns of the common variety arrived on May 1. Representatives of the Federation of the Bird Clubs of New England, Inc., visiting the island periodically, reported a very satisfactory number of breeding birds and a good hatch of young. They found the colony in excellent condition. Approximately 1,500 terns were banded. By August 25 the entire colony had left for other regions.

Periodical inspection and autopsy of specimens of the stock of cottontail rabbits showed that both young and adults were in good condition. There were 295 trapped on the island and liberated in suitable cover on the mainland. (See Game Distribution.)

It is planned to collect a number of native cottontails from wild life sanctuaries and private estates on the mainland for replenishing and changing the brood stock at Penikese and for restocking suitable covers over the State.

A survey of the quail colony was made during the fall, and the flocks of young quail raised during the summer were trapped, wing-clipped, and banded.

Samples of the water in the duck ponds were collected by the biologist and analyzed by the Department of Public Health. They reported only a small amount of salt in the water, and from all indications it is quite desirable as a water supply for wild birds visiting the island.

Some progress was made on the reforestation of the island with Carolina poplar, beach plum, privet, buckthorn, barberry, arbor vitæ, Scotch pine and sumac. Most of this stock took hold very well, although until a winter has passed it cannot be known whether or not these varieties are suitable for the climate. This program will be expanded as funds are available for obtaining stock.

The caretaker spent considerable time in cleaning up the island and breaking up further the concrete foundations of the old buildings. No further progress can be made on this work until funds are available for more blasting.

The usual amount of vegetable food was grown during the summer as a supply of winter food for the rabbits.

The caretaker co-operated with the Biological Survey in making a census of birds visiting the island, and by banding birds when time permitted.

A boat of a good, sturdy type was purchased for use of the caretaker in obtaining supplies at Cuttyhunk and for the transportation of officials visiting the island. This boat is the only means of communication with the outside world.

Other Sanctuaries

One addition was made to the wild life sanctuaries owned by the Division—the Edward Howe Forbush Wild Life Reservation of 5,000 acres in Hancock, a gift from the Federation of the Bird Clubs of New England, Inc. This sanctuary will preserve a scenic spot in that locality, and we believe will be the nucleus of a large sanctuary by future additions. It fittingly perpetuates the great services rendered to the Commonwealth by Edward Howe Forbush during his career as State Ornithologist, and his labors in the field of applied ornithology.

Owing to lack of funds very little was done to develop any of the sanctuaries. The Wild Life Sanctuary at East Sandwich and the 26-acre addition to the Boxford Sanctuary, were surveyed.

Reservations under Sections 69-75, Chapter 131, General Laws

No new reservations were formed under this act. The period for which the Harvard Forest Reservation in Petersham had been created expired February 15, 1928. On petition it was renewed for a five-year period from June 20, 1928, to June 20, 1933.

INLAND FISHERIES

GENERAL

(Additional details concerning the individual species will be found under Propagation of Fish and Game, and Fish Distribution.)

For many years the Division concentrated on the production of the several species of trout and very little attention was paid to producing, by one means or another, our common species of pond fish such as pickerel, horned pout, perches, etc. We are now giving belated recognition to the needs of our ponds and larger streams. Our inland waters may properly be divided into two classes—the brooks comprising our trout waters, and our natural great ponds of over twenty acres. The former group is under the control of the riparian owners, and at any time the public may be excluded from sections or from all of a good trout stream by the action of the land owners; but public fishing is guaranteed in all natural great ponds over twenty acres in size (which are not taken over to be municipal water supplies). It is our present intention to hold our trout production at about the present proportions until we are expending an equal amount of our appropriation on the enlargement of our facilities to produce the above species for restocking our ponds and larger streams.

We note a slowly increasing sentiment in favor of giving additional protection to the pond species—particularly pickerel. We can artificially prop-

agate trout and in many respects have control over the trout population in our waters: but we have an open season of three and one-half months. In contrast to this we have a ten months' open season on pickerel, and part of that comes immediately prior to the actual spawning period. We continue to point out that it is hopeless to expect to maintain an adequate stock of fish in our ponds without further protection to these species.

BROOK TROUT

The early weeks of the season were typical of the average open season. The waters were high and the weather cold. The present policy of planting only fish large enough to be caught when put out seems to be bearing fruit, for the general reports indicated more trout taken this year, and larger fish, than for a number of years.

Regulation of the Fisheries of the Deerfield River

By Section 54-A of Chapter 130, G. L. (enacted as Chapter 74 by this year's legislature) the law establishing a restricted area in the Deerfield River for the breeding and developing of trout, was extended to include the entire river and the Director extended the scope of his previously made regulations accordingly.

LOCH LEVEN, BROWN AND RAINBOW TROUT

The number of larger fish of these species taken during the year indicates the progress that we are making in planting brown trout (and from now on we shall consider the Loch Leven and the brown trout under the classification of "brown trout") and proves that this fish is particularly suited to our larger streams. The distribution of rainbows was small and confined almost entirely to the Deerfield River.

CHINOOK SALMON

The results from our continued limited plantings in certain ponds where this species has seemed to do reasonably well, justifies our continuing the policy.

WHITE PERCH

The usual salvage operations were conducted at Tashmoo Pond on Martha's Vineyard. For some unexplainable reason the fish did not come satisfactorily, and we discontinued operations after collecting and shipping only a small number as compared to previous years.

PIKE PERCH

These fish continue to supply a limited amount of sport in the Connecticut River. Some sizable fish have been taken in several great ponds where years ago a limited stocking was made with fry. However, it is doubtful, considering the difficulties of getting an adequate supply of eggs and the hatching and transportation, whether these fish will ever be considered extensively in connection with stocking our ponds.

PICKEREL

Progress has been made in increasing the stock of pickerel available for distribution, but we do not expect any substantial improvement until there has been a further reduction in the present open season.

SMELT

The smelt fishery during the past fall has not been considered up to the level of previous years. The limited spawning area adjacent to the principal fishing grounds is slowly but surely being encroached upon in one way or another, so that it appears that it will only be a question of time when some of the present principal spawning waters will be entirely wiped out. The only relief apparent is that of the State acquiring the land on either side of these streams for a sufficient distance to include all of the available spawning area, and having public sentiment combine to remove the menace of pollution and encroachment over these limited areas.

BASS

Better bass fishing has been reported in many of our waters than in previous years. Our stocking has been above the annual amount of small fish from the Palmer Hatchery, and this has been supplemented by a substantial number of brood fish collected by the salvage crews.

HORNED POUT

This fish is gaining in popularity from year to year. We are increasing the output from our pond cultural units, and we predict that in time it will be one of the principal fish taken in our ponds, esteemed both for sport and its excellent eating qualities.

PONDS

Public Rights

Apparently the public little understands the provisions of Chapter 453 of the Acts of 1923, which make it possible for ten or more residents of the Commonwealth to petition that public rights of way may be laid out to great ponds over twenty acres in area. As the stream fishing becomes more and more restricted and the public realizes its inviolate rights in the natural great ponds of twenty acres and upwards, we believe there will be a strong movement in favor of opening up such rights of way to a greater number of ponds.

In our last report we stated that such a petition was pending with reference to Walker's or Buck's pond, Harwich. A report was handed down by the board designated to act on such petition and a special report was filed with the Legislature by that board on December 30, 1927, to the effect that, upon careful consideration of all the evidence, no right of way for public access to Buck's Pond exists, and that public convenience and necessity do not require that such right of way be established. This report was heard before the Committee on Harbors and Public Lands in the Legislature. At this hearing the Director opposed the report of the above board, and advocated that a public necessity did exist, and that such right of way should be laid out. The above legislative committee visited the locality, held a public hearing on February 16, and in due course found that a public necessity did exist, and reported a bill (Senate 275) providing for such public right of way. This bill was enacted into law (Chapter 254, Acts of 1928), by which the County Commissioners were authorized and directed to lay out a right of way in the town of Harwich to Buck's Pond. The matter now rests with the County Commissioners of Barnstable County, who have sufficient authority to act when they receive a petition from the selectmen or inhabitants of the town of Harwich to take the required land by eminent domain.

A similar finding was made by the board in reference to Flax Pond, Brewster. A hearing on its report was held at the same time by the same legislative committee that acted on Buck's Pond. Also the committee investigated this pond on its travels, and discussed it at the same hearing. As the owner of all the land around this pond agreed to make it available to the public for fishing, no legislation was recommended by the Committee.

In our last report we discussed the status of natural great ponds between ten and twenty acres, showing that from Colonial times until 1869 the public had the same rights in these ponds as it had during that period, and still continues to have in natural great ponds of twenty acres and upwards. In 1869 an act was passed vesting the control of the fisheries in natural great ponds between ten and twenty acres in the riparian owners. We filed a recommendation with the Legislature of this year, providing that the public right of fishing be restored in these natural great ponds between ten and twenty acres, but it was disposed of by reference to the "next annual session." No sound reason ever existed for taking away these public rights, and we continue to recommend their restoration.

During 1928 the Waterways Division has surveyed (to establish the original area) Quinapoxet Village Pond, in Princeton and Holden. It was found to have been originally over twenty acres, and is therefore a great pond.

Great Ponds Stocked and Closed

The following-named ponds were stocked under Section 28, Chapter 130, General Laws, and regulations (Form 1) applied which will be in force for the periods named below. These regulations prohibit all fishing in the ponds from November 1 to May 30, and in all tributary streams except between April 15 and July 31. Fishing is permitted only with a hand line and single hook, or a single hook and line attached to a rod or pole held in the hand:

Lake Pearl (also called Whiting's Pond, Wrentham)	Jan. 15, 1928, to Nov. 1, 1930
Congamond Lakes, Southwick	Nov. 1, 1928, to Nov. 1, 1931
Long Pond (also called Long Lake) Littleton	Nov. 1, 1928, to Nov. 1, 1931
Spectacle Pond, Lancaster	Nov. 1, 1928, to Nov. 1, 1931
Watsons Pond, Taunton	Dec. 1, 1928, to Nov. 1, 1931
Quannapowitt Lake, Wakefield	Dec. 15, 1928, to Nov. 1, 1931

Under the above law the following-named ponds were stocked with regulations (Form 2) to be in force for the period Nov. 1, 1928, to Nov. 1, 1931 (except as otherwise noted). These regulations permit fishing with not more than two hooks and lines (a plug, spinner or artificial bait rigged with triple or gang hook to be considered as one hook), subject to all laws relative to the open seasons on the taking of fish:

Little Long Pond, Plymouth	Jan. 15, 1928, to Nov. 1, 1930
West Pond, Plymouth	Nov. 1, 1928, to Nov. 1, 1931
Billington Sea, Plymouth	Nov. 1, 1928, to Nov. 1, 1931

Privately-owned or Controlled Ponds Stocked

Following is a list of privately owned ponds (or natural great ponds from 10 to 20 acres in which the fishing rights are now vested in the riparian owners), which were stocked during the period of this report on the stipulation of the riparian owners that the public may fish therein for the period indicated (in most cases, 10 years):

<i>Pond</i>	<i>Town</i>	<i>Fishing permitted to</i>
Bates and Powers Pond	Phillipston	Feb. 25, 1938
Box Pond	Bellingham	Sept. 29, 1938
Bemis Pond	Chicopee	June 6, 1938
Beaver Pond	Franklin	Sept. 29, 1938
Cranberry Pond	Bellingham and Blackstone	Until such time as Woonsocket takes this pond as water supply
Fort Meadow Pond	Marlboro	Dec. 14, 1937
Grove Pond	Ayer	April 11, 1938
Kingsbury's Pond	Medfield	Oct. 23, 1938
Lost Lake	Groton	May 17, 1938
Mill Pond	Gardner	Jan. 23, 1938
Mill Pond (Pond south of No. Bellingham)	Bellingham	Mar. 26, 1938
Mud Pond	Winchendon	May 26, 1938
Milford Pond	Swansea	Oct. 30, 1938
Old Reservoir	Northampton	Mar. 11, 1938
Pillings Pond	Lynnfield	No date specified
Plashes Pond	Yarmouth	Dec. 2, 1937
Plow Shop Pond	Ayer	April 11, 1938
Rudd Pond	Becket	Dec. 17, 1937
South Athol Pond	Athol	Dec. 24, 1937
Small's Pond	Brewster	Dec. 2, 1937
Shirley Reservoir	Lunenburg and Shirley	Oct. 5, 1938
Tully Pond	Orange	Jan. 30, 1938
Wampatuck Pond	Hanson	Mar. 28, 1938

Following is a list of privately-owned ponds (or natural great ponds from 10 to 20 acres) stocked with the consent of the owners, but without the stipulation permitting the public to fish therein for a period of years.

<i>Pond</i>	<i>Town</i>
Flyaway Pond	Easton
Hoxies Pond	Sandwich
Long Pond (Ames Long Pond)	Easton and Stoughton
Noquochoke Pond	Dartmouth
Phillips Tack Factory Pond	Hanover and Hanson
Picker Pond	Easton
South Triangle Pond	Plymouth

In both groups of waters it is necessary that a sporting license be purchased in order to fish them.

The following privately-owned ponds were stocked on agreement by the owners to permit the Division, in future, to take an equal number of stock from the resulting increase:

Pond of Herbert R. Wolcott, located on his farm on the Belchertown Road near the Pelham Line, but in the town of Amherst, yearling horned pout and pickerel.

Hazelbrook Pond, Wayland, located on property of J. Sydney Stone, yearling trout.

Hood Pond, Beverly, located on property of C. H. Hood, mixed pond fish.

Breeding Areas in Great Ponds

Upon petition from the town of Wales received in the last fiscal year, the following described portion of Lake George (also called Wales Pond), in the town of Wales, was set aside as a breeding area for food fish of all species, for five years from December 1, 1927:

That portion lying south of a line drawn from a rock at the water's edge on the west side of the lake near the cottage owned by Wm. T. Hollister of Hartford, Conn., easterly to the northernmost part of a point of land upon which are two cottages belonging to Harry Royce of Wales, Mass.

The regulations are as follows:

"No fish of any species shall be taken from said waters without the written consent of the Director of the Division of Fisheries and Game—provided that employees of the Division may take fish for re-stocking purposes."

Violation of the regulations carries forfeiture of license and fine not exceeding twenty dollars.

A petition for similar action on Bare Hill Pond, Harvard, was received and acted on, but the regulations do not become effective until the period of the next report.

FISHWAYS

No new fishways were installed on alewife streams during the year. Considerable correspondence was handled at the central office on the subject of fishways and advice given on the proper methods of their construction, and plans and specifications of existing fishways were given to several interested persons. Whenever time permitted, the larger and more important fishways in the State were examined during the beginning of the run of fish, and the owners of the dams on which fishways are located were instructed to keep the fishways open from the beginning to the end of the run, and to open them again in the fall to permit the passage of young fish to the sea.

On the more important fishways, representatives of this Division were assigned to make periodical inspections to insure the safe passage of fish to the spawning grounds and to keep records of the various species observed using the fishways.

POLLUTION

A number of pollution complaints were investigated, samples of the polluted water collected by the Health Department, and negotiations opened with the owners of the offending plants, with the end in view of curbing any further violation of the laws by the discharge of such trade waste into our rivers and streams.

PROPAGATION OF FISH AND GAME

FISH HATCHERIES AND GAME FARMS

General

We have continued our present policy of building up, in permanent form, our fish hatcheries, so as to take care of the present production. This is proceeding slowly, and it is not our intention to enlarge the productive capacity of these plants until all buildings are in good condition, adequate equipment supplied, and all existing ponds properly constructed with concrete flumes to replace many dilapidated wooden structures.

At the game farms the great need at the moment is for more brooder houses, rearing pens and holding yards.

We have continued our policy of planting only trout six inches or over in the spring. Also, with the assistance of the local fish and game clubs and individuals, we are carrying our annual production of pheasants over the winter to be liberated in the spring as adult stock.

The reforestation program was continued, as noted under the individual stations, with spruce, Scotch, red and white pine, furnished by the Division of Forestry. From the Sutton Hatchery shrubs, vines and black walnut trees were furnished.

Ayer Game Farm

Repairs were made on the superintendent's house to the extent of painting it, putting in a window, rebuilding a portion of the porch with concrete, and screening in the same.

A combination incubator cellar and utilities building was built.

Additional equipment was purchased, consisting of a few small portable pens, an incubator, three brooder units, and a small tractor.

Some additional work was done on the dam in connection with flowing a sizable pond for the rearing of pond fish. In this were planted 200 yearling and adult horned pout from the Stockwell Ponds.

We are carrying this property with a ten-year lease with an option of purchase. This year a strip of land across the road from the superintendent's house was added to the tract by deed from the New England Power Construction Company in exchange for a perpetual easement to run a power line across a corner of the premises.

Former Warden Edward E. Backus, who owns the farm, was transferred from the warden force on October 1 to the Game Culturist classification, and is now superintendent of this station. This is the first step towards operating it next year for the production of pheasants—heretofore it has been used only to house the egg-stock from which eggs were collected for distribution and hatching by clubs and individuals.

In continuance of the reforestation work 1,600 trees were set out, together with a selection of shrubs, fruit trees, grape and berry vines.

Pheasants.—There were 692 adults on hand December 1. Of these 283 were distributed for wintering during December and January, 14 were lost prior to the breeding season, and 90 distributed for liberation, leaving 305 on hand at the beginning of the laying season. To these were added 70 (50 hens and 20 cocks) purchased pheasants. From this stock 18,475 eggs were collected, of which 12,711 were sent to clubs and individuals for hatching. 525 were sent out of the State, 400 to the East Sandwich Game Farm for experimental work, 3,790 were used for feeding young pheasants, and 1,049 set in incubators in experimental work, from which 584 young pheasants hatched. There were 322 lost, 4 sent away for pathological examination, 13 distributed for liberation, 168 for wintering, and 77 remain on hand

for additions to next year's egg and brood stock. (It is planned next year to operate this station for the production of birds for distribution, as well as for the production of eggs.)

Of the 375 on hand at the beginning of the breeding season 48 were lost, 100 distributed for liberation, and 227 are held for the 1929 brood stock. There were received for brood stock 250 (hens) (1928-hatch) from the Marshfield Bird Farm, and for the egg-producing stock 250 (hens) from the East Sandwich Game Farm. Twenty-five were lost, and 475 (plus the 227 above) remain on hand November 30.

East Sandwich Game Farm

A combination garage and storage building was erected. A number of the brooder houses and adjoining yards were painted. Brush and trees were cleared off a large part of the game farm, and post holes dug preliminary to further pen construction.

For use in quail production 50 breeding pens 10 x 6 x 6 were built. Seven Putnam brooder stoves were purchased, and small brooder houses to handle them were constructed.

The land holdings were rounded out by the purchase of the Armstrong and Fish tracts, heretofore under lease. The whole property was surveyed and concrete boundary posts set up. The farm was extended by adding to it the land on the south side of the railroad track formerly part of the East Sandwich Fish Hatchery (except the Nye homestead and that area occupied by the hatchery buildings and pools). A start was made in clearing the brush and trees from this section, that it may be fenced and put in use.

Six thousand pine trees were planted, in continuation of the reforestation program, together with shrubs, fruit trees, berry and grape vines.

A substantial portion of the time during the winter months was devoted to trapping wild quail for addition to the brood stock.

Pheasants.—The 571 adult pheasants on hand December 1 were reduced by distribution of 95 for wintering, 28 for liberation, and loss of 58, to 390 at the beginning of the breeding season. 11,400 eggs were collected, 400 received from the Ayer Game Farm and 200 from the Marshfield Bird Farm for experimental work, making a total of 12,000 eggs set. At this, as at the other game farms, we continued our investigations on the spread between the number of eggs placed in incubators and the number of young birds reared.

6,481 young pheasants were hatched, of which 4,219 were lost, and 2,262 reared. These were disposed of as follows: 32 escaped, 1,290 distributed for wintering, 197 distributed for liberation (of which 153 were used first for field trials), 8 were given in exchange for birds liberated by an individual from his own stock, 250 (hens) sent to the Ayer Game Farm for 1929 egg stock, and 130 (hens) to the Wilbraham Game Farm for 1929 brood stock. (380 of the 1928-hatched pheasants distributed for all purposes should be classified as 1928 adults.) 355 remain on hand November 30 for additions to the brood stock and distribution next spring. There are also on hand 57 hen pheasants (1928-hatched) purchased, which will be used in making up the 1929 brood stock.

Of the 390 adults on hand at the beginning of the breeding season 46 were lost, 151 distributed for liberation, and 193 are on hand for the 1929 brood stock.

Quail.—The year opened with 91 adult quail on hand, 52 of which were hatchery-reared stock of 1927, to which were added 36 trapped wild birds. These 127 were reduced by loss of 29 and distribution of 2 for experiment, to 96 at the beginning of the breeding season. There was an excess of cocks, but 39 pairs were placed in separate breeding pens 10 x 6 x 6. In a corner of each pen was placed a sloping cover about 30 inches square, about 18 inches above the ground in front and 10 in the rear, to serve as a protection from the rain. The birds had otherwise only the natural ground cover, which was rather scanty at the start. After the quail had been in the pens some time it was noticed that they perched on top of these covers a great

deal of the time, and often took to jumping up and down and flying without first being alarmed. This continued more or less through the laying season. The pens were placed quite close together, which also may account for the restlessness of the birds.

The quail were very late in starting to lay, so that the first eggs came about June 30, and only 11 pairs laid at all—a total of 321 eggs. These ranged from 76 eggs from one pair to 18 from the pair producing the lowest number—one pair was killed by a weasel just as they started to lay. This very poor laying may be accounted for by the restlessness of the birds noted above, and also to the fact that all home-reared birds of 1927 were mated with wild trapped birds of last winter.

From the 321 eggs collected, 212 young were hatched and 109 eggs contained infertile and dead germs. 120 young birds were lost and 92 remain on hand November 30.

Of the 96 on hand at the beginning of the breeding season 26 were lost and 70 remain on hand November 30. All will be reserved for brood stock next year.

Considerable loss occurred while experimenting with brooders, 12 and 14 young respectively being lost in two brooders when the light blew out or the flame smothered itself by being too high. These were the last two lots to hatch in September. Also a skunk destroyed a whole setting of eggs during incubation under a bantam hen.

Marshfield Bird Farm

Most of the time during the winter was employed in remodelling the small brooder house. This consisted of a six-foot extension the entire length of the building (excepting the central heating plant) with windows in the sides, and 18 windows in the roof. The entire building was raised 2 feet and 18 ventilating windows made on the back. The house was divided up into 18 compartments and equipped with special frames covered with cloth to control drafts. The heating pipes were re-arranged and new hovers installed. The entire floor of the original brooder house and the extension was replaced with concrete. The chimney for the heater was replaced.

The portions of the large brailing yard constructed last year were wired in. The frame-work adjoining the fancy pheasant pens was covered with wire. All of the 80 portable breeding pens were taken down, thoroughly sterilized, repaired, re-painted and set up on new ground inside the large brailing yard for handling this year's brood stock. The ground inside the pens in front of the large brooder house 85 x 200 feet was removed to the depth of five to six inches, the remaining surface was heavily limed, and then refilled by a layer of from five to six inches of sand. The yards adjoining the brooder houses—five 38 x 200 feet—on the hill were similarly treated. The large yard around the orchard where formerly the brood stock was carried, was plowed under.

The inside of the large brooder houses was repaired by replacing extensive portions of the floor sills and floor and reinforcing the walls and roof.

A number of small wooden sheds were constructed for shelters in the holding yards and for use later in handling the small birds and in the rearing yards. Most of the grass and brush in the large brailing yard was mowed and shelters constructed for carrying the birds through the winter.

Windows, doors and chimneys were added to complete the five brooder houses and pens on the hill.

In continuance of the reforestation program 1,750 trees were set out, as well as a selection of shrubs, grape and berry vines, and fruit trees.

Miscellaneous repairs were made on the heating system, and considerable painting done throughout the plant.

Pheasants.—The year opened with 491 adults on hand, which were reduced by losses of 18, distribution for liberation of 69, and 3 escapes, to 401 at the beginning of the breeding season.

There were 13,630 eggs collected, 200 of which were sent to the East Sandwich Game Farm for experimental work, and 13,430 set in incubators.

5,868 eggs proved infertile, and 7,562 chicks hatched. Of these 3,940 were lost and 3,622 reared and disposed of as follows: 100 distributed for liberation (of which 50 were used first for field trials), 1,979 sent out for wintering, 16 given in exchange for birds sent to the Wilbraham Game Farm from a private breeder, and 166 transferred to the brood stock. 250 (hens) were sent to the Ayer Game Farm for part of the 1929 egg stock, and 240 (hens) to the Wilbraham Game Farm for part of the 1929 brood stock. (750 of the 1928-hatched pheasants distributed for all purposes should be classified as 1928 adults.) There remain 871 on hand November 30, for additions to brood stocks at this and other stations and for spring liberation.

Of the 401 adults on hand at the beginning of the breeding season 12 were lost and 389 remain on hand November 30 plus the 166 1928-hatched brood stock.

Wilbraham Game Farm

On December 1, 1927, Frederick W. Wood, caretaker of the Penikese Island Sanctuary, was promoted to the position of Superintendent of the Wilbraham Game Farm, made vacant by the resignation on the last day of the previous fiscal year, of Mrs. Alice E. Mosher.

A portion of the fence surrounding the large brailing yard was re-located to greatly increase the size of the yard. Repairs were made on a number of the brooder houses and on some of the rearing yards.

A small amount of additional equipment was added, such as brooder stoves, feed hoppers, etc.

In continuance of the reforestation work, 1,500 trees were set out, together with a selection of fruit trees, grape and berry vines.

Pheasants.—The 420 adults on hand December 1 were reduced by losses of 11, distribution of 8 for liberation, and distribution of 8 for wintering, to 393 at the beginning of the breeding season.

14,016 eggs were collected, 54 of which were broken and 13,962 set in incubators. 6,388 were infertile in incubators or contained dead germs, and 7,574 hatched. Beginning the week of July 29 there were abnormal losses among the pheasants up to fifteen days old. The birds appeared to be perfectly well and very active, and then would suddenly flop over and die without warning. White droppings were noticed on the feeding boards three to four days before the heavy mortality started, but these were thought to be due to feeding semi-solid buttermilk.

The best scientists available, and authorities on bird diseases and bird culture, were immediately consulted. Two of them visited the game farm personally and carefully studied the conditions under which the young birds had been hatched and reared. They also advised the superintendent as to the proper methods of treatment and prevention of spreading the epidemic further. Specimens were autopsied on the grounds, and several specimens taken away for laboratory study. Living and dead specimens of young pheasants of all ages, as well as of the breeding stock, were sent away for observation and autopsy, and the reports of the findings from the independent scientists performing these autopsies proved that coccidiosis was present among the young pheasants, and three of the brood stock autopsied were found to be suffering from tuberculosis.

Up to the time of the outbreak of this epidemic some of the brood stock had been shipped away. Upon receiving the reports of the examination of the adult birds, the remaining adult stock was quarantined in an isolated section of the farm pending a decision as to its disposition. By the middle of August conditions appeared normal and extremely warm weather and sun cleared up much of the trouble. Of the 7,574 pheasants hatched 5,161 were lost, 2,413 reared and disposed of as follows: 24 sent away for pathological examination, 2 escaped, and 2,387 distributed for wintering (373 of the 1928-hatched pheasants distributed for all purposes should be classified as 1928 adults.) At the close of the year there are no 1928-hatched pheasants on hand.

Of the 393 on hand at the beginning of the breeding season 133 were lost,

2 escaped, 20 were sent away for pathological examination, 42 distributed for liberation, and 196 remain on hand November 30.

For part of the brood stock of 1929 there were received (all 1928-hatched stock) 130 (hens) from the East Sandwich Game Farm, 240 (hens) from the Marshfield Game Farm, 50 (cocks) from a private breeder (34 of which were purchased and 16 received in exchange for an equal number from the Marshfield Game Farm). Of these 420 birds, 2 escaped, 29 were lost and 389 remain on hand November 30.

Amherst Rearing Station

The superintendent's cottage received additional inside repairs and equipment.

Three-inch galvanized iron pipe was laid to place under ground our principal water conduit, making possible the removal of an unsightly wooden trough. A new tile system was laid so that a large portion of the pools could be cleaned without the waste passing through the remaining pools.

The four large ponds and the square head-pond in connection with them, which have been under construction for over a year, were completed.

The wooden holding boxes were relocated in conjunction with the sorting troughs, all abreast of the loading stand, which will facilitate the handling of fish and greatly improves the appearance of the grounds.

The outbuildings received a coat of paint.

In continuance of the reforestation program, 3,125 trees were set out, together with a selection of shrubs, fruit trees, grape and berry vines.

With the purchase of the Bartlett-Whitcomb and the Clark tracts, all of the land previously held under lease is now owned by the Division.

Brook Trout.—The year opened with 27,680 fingerling brook trout on hand (a recount added 680 to the previous inventory). These were all distributed in the spring as yearlings.

For the work of the season 111,000 fry were received from the Montague Fish Hatchery. There were losses of 29,000 as fry and 82,000 were reared to fingerlings. There were 6,600 fingerlings lost, 20,400 distributed, and 55,000 remain on hand to be carried through the winter for spring distribution.

Brown Trout.—From the beginning of the year both brown trout and Loch Leven trout have been grouped under the term "brown trout," in our records. The year opened with 14,000 brown trout fingerlings on hand, which were transferred to yearlings. 452 were lost, 8,548 distributed to open waters (of which 24 went first to the Eastern States Exposition, 12 to the Franklin County Agricultural Society's Fair at Greenfield, and 12 to the fair of the Worcester Agricultural Society at Worcester), and 5,000 remain on hand November 30.

The 200 yearlings on hand at the beginning of the year were added to the 1,477 adults carried over from the previous year (a recount added 144 to the 1,333 recorded as being on hand at the close of last year). To these were added four received from the Palmer Fish Hatchery. 133 were lost, 598 distributed to open waters (of which 12 went first to the Eastern States Exposition, 7 to the Franklin County Agricultural Society's Fair at Greenfield, and 6 to the fair of the Worcester Agricultural Society at Worcester), and 950 remain on hand November 30.

For the work of the season 351,600 eggs were collected and sent to the Palmer Fish Hatchery for hatching. 72,200 fry from these eggs, and 95,580 fry from eggs received from the U. S. Bureau of Fisheries Station at Bozeman, Mont., hatched at Palmer, were received for further rearing. 155,780 were lost, 100 distributed as fingerlings (first going to the Eastern States Exposition), and 11,900 remain on hand November 30.

East Sandwich Fish Hatchery

The Nye house was repaired by replacing a window on the front side, placing cap over the front door, and repairing and replacing shutters.

A porch to the meat house was rebuilt.

One of the pools was filled with gravel sufficiently to facilitate cleaning, and the hatchery grounds drained by the laying of considerable tile.

Several small pools were dug on the westerly side of the pond in order to provide additional waters in which to start fry.

Practically all of the former hatchery grounds (except that portion immediately around the rearing pools and round the Nye house) was added to the East Sandwich Game Farm.

Continuing the reforestation program, 2,750 trees were set out (of which 50 were black walnut), together with shrubs, fruit trees, grape and berry vines.

A survey of the grounds was started, but had not been completed at the close of the year.

Brook Trout.—The year opened with 43,650 fingerling brook trout on hand. 15,872 were lost and 27,778 reared and transferred to yearlings. Of these 1,208 were lost, 22,710 (6 inches or over) were distributed to open waters, 600 were sent to club rearing pools, and 3,260 placed in the large pond for further growth and are on hand November 30.

For the work of the season 70,000 fry were received from the Sandwich Fish Hatchery, 25,065 of which were lost and 44,935 reared and transferred to fingerlings. To these were added 35,000 fingerlings received from the Sandwich Fish Hatchery. 21,915 were lost, and 58,020 are on hand November 30 to be carried through the winter for spring distribution.

Chinook Salmon.—The year opened with 4,922 fingerlings and 221 yearlings on hand. 22 fingerlings were lost, and 4,900 fingerlings and the 221 yearlings were distributed to open waters.

Blue Gills and Crappie.—6,000 fingerling blue gills and 4,000 fingerling crappie from the Stockwell Ponds were planted in the large pond on the hatchery grounds as an effort to establish a brood stock of pond fish at this station.

Steelhead Trout.—25,000 steelhead trout eggs received from the U. S. Bureau of Fisheries Station in Oregon resulted in 14,500 fry, which were distributed.

Montague Fish Hatchery

The outstanding addition to the plant was the partial erection of a home, on the grounds, for the superintendent. It consists of a ready-cut, eleven-room house purchased from the Aladdin Company of Bay City, Mich. It was erected on a concrete foundation, with a cellar extending the entire length of the house—the cellar floor of concrete. The building was constructed to the extent of completing the exterior finish, and then locked up to await completion out of next year's appropriations.

The meat house was repainted.

Extensive improvements were made to the road through the hatchery grounds.

Additional work was done in the way of digging the new channel of the brook before it could be changed. At the outlet of the new bed of the brook a concrete dam with spillway was constructed to regulate the flow of water in the brook.

The large wooden dam on the pond series below the hatchery building was replaced with one of concrete, and a portion of the brook below walled up with stone. A run-off ditch at one side of this dam was placed under ground with galvanized iron pipe. The whole location was reggraded. A number of wooden dams upstream from the above large dam were replaced with concrete, together with a concrete flume in front of the hatchery building. This included dams for the small nursery ponds and at a cut-out in the run-off brook.

A large number of stumps, and much brush, were removed from the ground generally.

With the additional contributions from the Franklin County League of Sportsmen's Clubs, received in the fall, construction was started on an additional series of large rearing pools on the area that had been cleared of stumps earlier in the year.

The White truck formerly used by Salvage Unit No. 1 was transferred to this station and the Reo truck was sent to the Palmer Fish Hatchery to replace a worn-out Stewart.

In continuance of the reforestation program, 10,429 trees were set out, together with shrubs, fruit trees, grape and berry vines.

The grounds were completely surveyed.

Brook Trout.—The year opened with 93,800 fingerling brook trout on hand. 1,300 were lost as fingerlings, 4,000 were distributed to local brooks, and 88,500 were transferred to yearlings. 9,770 of these were lost, 75,730 yearlings were distributed to open waters (of which 72,320 were 6 inches or over), and 3,000 were distributed to club rearing pools.

There were 384 yearlings on hand at the beginning of the year, of which 109 were lost, and 275 transferred to adults and added to the 443 carried over from last year (a recount added 150 to the 293 recorded as being on hand at the close of the previous year). 50 were lost, 18 distributed to open waters (12 going first to the Eastern States Exposition and 6 to the fair of the Worcester Agricultural Society) and 650 remain on hand November 30.

For the work of the season 420,000 brook trout eggs were received from the Sandwich Fish Hatchery. 39,000 were lost, and 381,000 fry hatched. Of these 35,000 were lost, 111,000 transferred to the Amherst Rearing Station, and 235,000 reared to fingerlings. These were disposed of as follows: 86,350 were lost, 26,350 distributed to local brooks (of which 100 went first to the Eastern States Exposition), 12,000 to club rearing pools, and 17,300 to the U. S. Bureau of Fisheries Station at Nashua, N. H. (5,000 in exchange for rainbow trout received this year, and 12,300 for rainbow trout to be received in the spring of 1929). 93,000 remain on hand November 30 to be carried through the winter for spring distribution.

Rainbow Trout.—The year opened with 40 yearling rainbow trout on hand which were transferred to adults. 8 were lost, 12 distributed to open waters (of which 8 went first to the Eastern States Exposition and 4 to the fair of the Worcester Agricultural Society), and 20 remain on hand November 30.

There were on hand at the beginning of the year 14,000 rainbow trout fry and fingerlings, 6,200 of which were lost as fingerlings, 6,000 distributed as fingerlings, and 1,800 yearlings remain on hand November 30.

5,000 fingerlings were received from the U. S. Bureau of Fisheries Station at Nashua, N. H., in exchange for an equal number of brook trout fingerlings. 1,200 were lost and 3,800 remain on hand November 30.

Palmer Fish Hatchery

A new roof was put on the double tenement house and the house was generally repaired, outside and in. Minor repairs were also made on the superintendent's house, and a small section of wooden walk replaced by one of concrete.

Repairs were made to a portion of the floor of the hatchery building.

The shiner pond was cleaned out over a substantial area, near the dam, to permit of the better seining of the pond. The remaining banks of the trout pools were raised for winter rearing of trout.

The water supply brooks were opened up to increase the volume.

Additional grading was done around some of the ponds; the driveway to the trout pools was partly resurfaced with cinders; markers were set and a line struck for the proposed pond below the bass ponds.

Continuing the reforestation program, 1,050 trees were set out, together with a selection of shrubs, fruit trees, grape and berry vines.

Brook Trout.—The year opened with 37,263 fingerling brook trout on hand. 1,952 were lost and 35,311 transferred to yearlings. 12 were given away for research work, 14,328 were lost, 500 distributed to club rearing pools, 20,471 distributed to open waters (all of which were 6 inches or over).

40 adults were collected from the back brook on the hatchery grounds and distributed to open waters.

For the work of the season 80,000 brook trout eggs were received from the

Sandwich Fish Hatchery. 2,000 were turned over to the South Boston Aquarium, 6,828 were lost, and 71,172 fry hatched. Of the fry 7,122 were lost and 64,050 were reared and transferred to fingerlings. To these were added 10,000 from the Sandwich Fish Hatchery. 11,900 were lost, 23,300 distributed to local brooks, and 38,850 remain on hand November 30.

Brown Trout.—From the beginning of this year both brown trout and Loch Leven trout have been grouped under the term "brown trout" in our records. 351,600 eggs were received from the Amherst Rearing Station for hatching. It was three months before there was any evidence of these eggs eyeing out, and those that hatched proved to be very poor and many of them died almost immediately after hatching. In addition 100,000 eggs were received from the U. S. Bureau of Fisheries Station at Bozeman, Montana, in exchange for brook trout eggs. 200 of the eggs were given away for study purposes. The remainder hatched satisfactorily, resulting in 289,868 fry, of which 122,088 were lost and 167,780 transferred to the Amherst Rearing Station. (2,200 of these were fry from the eggs collected at Amherst Rearing Station, and 165,580 from the U. S. Bureau of Fisheries eggs).

Four adult brown trout (from one of the supply ponds) were sent to the Amherst Rearing Station, and 2 were distributed to open waters (one going first for display in a store window and one being first tagged for experimental purposes).

Small-mouth Black Bass.—There were 449 adults on hand at the opening of the year. 49 were lost, 10 distributed to open waters (of which 4 went first to the Eastern States Exposition and 6 to the fair of the Worcester Agricultural Society). 34 adults from Crystal Lake, Wakefield, were added to this brood stock, so that 424 remain on hand November 30.

From the bass ponds there were collected and distributed 277,500 fry and 16,652 fingerlings (of which 100 went first to the Eastern States Exposition and 52 to the fair of the Worcester County Agricultural Society).

Large-mouth Black Bass.—From the supply pond 2 adults were distributed to open waters (first going to the Eastern States Exposition).

Blue Gills.—From the supply pond 432 adult blue gills were collected, 267 of which were transferred to the Stockwell Ponds for brood stock, and 165 distributed to open waters.

Horned Pout.—400 adult horned pout on hand at the beginning of the year remain on hand November 30.

From the supply pond 8,000 fingerling horned pout were collected and distributed to open waters.

The adult horned pout salvaged from the private pond of E. A. Wood, in Prescott, were held at the station for a period, and later distributed.

Pickarel.—The adult pickarel salvaged from the private pond of E. A. Wood of Prescott, were held at the station for a time, and later distributed.

From the supply pond 22 fingerlings, 84 yearlings and adults, were collected and distributed to open waters (of which 8 fingerlings and 24 yearlings and adults went first to the Eastern States Exposition).

Sandwich Fish Hatchery

The hatchery building was extended and put on a concrete foundation, and a new roof of fire-proof shingles put on.

Two additional large ponds were constructed to hold an increased amount of brood stock, and wells driven to supply additional water to these pools.

In continuance of the reforestation program, 1,900 trees were set out, together with a selection of shrubs, fruit trees, grape and berry vines.

A survey of the grounds was begun, which had not been completed at the close of the year.

Brook Trout.—The year opened with 99,910 fingerling brook trout on hand. 255 were lost, 24 distributed for study purposes, and 99,631 reared and transferred to yearlings. 16,746 were lost, 67,135 distributed to open waters (all over 6 inches), (of which 35 went first to the Quincy Trading Post). 9,300 were sent to club rearing pools and 6,450 remain on hand November 30.

There were 3,149 yearlings on hand at the beginning of the year. 160 were lost, and 2,989 reared and added to the 1,600 adults brought over from last year. 675 were lost, 901 distributed to open waters, (1 went first to the Quincy Trading Post), and 3,013 are on hand November 30.

1,190,000 eggs were collected from station stock and 25,000 wild brook trout eggs were received from the U. S. Bureau of Fisheries Station at Berlin, N. H. 35,400 eggs were lost, 420,000 sent to the Montague Fish Hatchery, 80,000 were sent to the Palmer Fish Hatchery, 500 distributed for study purposes, and 50,000 were sent to the California Fish and Game Commission in exchange for Chinook salmon eggs to be shipped to us in the next fiscal year. 629,100 fry were hatched. Of these 75,000 were lost, 70,000 transferred to the East Sandwich Rearing Station, 76,800 transferred to the Sutton Fish Hatchery, 100 distributed (going first to the Quincy Trading Post), and 407,200 reared and transferred to fingerlings. 175,300 fingerlings were lost, 10,000 transferred to the Palmer Fish Hatchery, 35,000 transferred to the East Sandwich Rearing Station, 60,000 sent to club rearing pools, 23,000 planted in local brooks, and 103,900 are on hand November 30.

Sutton Fish Hatchery

Inside repairs and additions were made to the house on the grounds. A new roof was put on the wagon shed. Additional fill was added to the road into the hatchery grounds; and fence posts set for a new line of fencing to replace that washed out by the flood of the previous year.

A part of the outside buildings was repainted.

Forestry work at the hatchery is largely in connection with the work at the pond units. 2,500 trees were transferred to the ponds from beds on the hatchery grounds. 8,000 forest trees were received from the Division of Forestry, of which 100 were shipped to Penikese Island Sanctuary, 2,700 placed in beds at the hatchery, and the remainder planted around the ponds as noted elsewhere.

Brook Trout.—The year opened with 35,000 fingerling brook trout on hand, which were reared and transferred to yearlings. 15,065 were lost, 19,935 distributed to open waters (18,010 of which were 6 inches or over).

For the work of the season 76,800 fry were received from the Sandwich Fish Hatchery, which were reared and transferred to fingerlings. 36,600 were lost, 50 distributed to open waters (going first to the fair of the Worcester Agricultural Society), 150 given away for experimental purposes and study, and 40,000 remain on hand November 30 to be carried through the winter for spring distribution.

FIELD PROPAGATION

Stockwell Ponds Unit

In furtherance of our policy of building up the production of pond fish, the following work was done on the pond cultural units operated in conjunction with the Sutton Fish Hatchery.

Owing to seepage in the fill at the Arnold dam, which was of loose material dumped off when the pond was full, that portion was dug out when the pond was drained, and spread out on a wider base, and the fill completed with heavy loam well compacted and a gravel face. Further protection wall was built around the upper part of the flume. The stone facing on the lower side of the dam was carried higher and additional fill made to level off the top of the dam.

While employing a power shovel for this work the road to the dam was graded, and a road cut through the sand hill to the Freeland Cove, where reserved brood stock is held.

Throughout the entire winter a large amount of trees and brush were removed from the middle dam in the area to be flowed. Additional fill was placed on the middle dam to increase its height and the stone facing carried up an equal distance.

A heavy fill was made across Schoolhouse dam to permit raising the water some two feet above the former level. At the east end a loose rock fill

was dug out to the bottom of the pond and replaced with the new material, and through the whole length the new fill was held at the shore line on a footing of heavy boulders.

The stone raceway in the Putnam dam was laid up to a point which would permit of building the stone facing on the upper side of the dam out to a considerable distance on each side of the flume. In addition, substantial fill was made on one side in order that stone walls could be carried up some three feet above the water level as a safeguard to traffic using the two roads which cross adjacent to this dam. The plank drift shield at the outlet was removed, and the new wall was carried across on a reinforced concrete bridge to serve in its place.

Sutton-Thompson Unit

On the Thompson dam the stone facing on the up-stream side was carried to a substantial height and on the down-stream side to an equal height around the outlet. A heavy fill was made to permit carrying a good head of water in the Thompson pond during the coming year. Material for the fill was taken, in part, from a cut at the south end that will serve as a storm overflow when the pond is completed.

The Town of Sutton dam was repaired to stop some seepage which appeared after the pond was run full, and as this seepage appeared to be due to loose material in the old part of the dam dating back to the eighteenth century, a line of plank piling was carried through it.

Welsh-Sullivan Unit

Construction was started on the dam at the outlet of the brook on the Welsh-Sullivan tracts. This dam is built of heavy stone, reinforced with concrete, backed with a heavy clay fill, and when completed will make an additional pond of about twenty-five acres. The work around the flume was carried up to the maximum height contemplated and the wings extended to a point which will permit of a partial filling of the pond during the coming year. As a further extension of the wings for an eventual raise of level, dykes were built of material thrown up from the bottom clay of the pond.

A substantial number of trees and a large amount of brush were removed from all these pond locations. Co-operative work was done by the Town of Sutton in raising the road levels and building a larger culvert at the head of the Welsh Pond.

Extensive reforestation was done around all the ponds in this series, and considerable upland was cleared of reserved growth, dead and broken trees, by the lessors, for future planting.

Breeding and Production

The breeding, production and distribution at all the ponds are reported on collectively. This for the reason that the units are not yet sufficiently developed to be handled separately.

The breeding was normal, or better, with all fish except pickerel. Pickerel fingerlings were found in the ponds only in small numbers, and the distribution was mainly of yearlings from the fingerlings left in the ponds the previous year. The cause appeared to be mainly that it was a non-breeding year for pickerel, but a possible contributing cause was found in the presence of otter, late in the season, and a considerable depletion of the larger breeding pickerel, the inference being that the otter were there early and had fed on the larger fish, pickerel by preference as being the largest and easiest to catch. The production of blue gills was unusually large and the growth was above the average, probably due to a better adjustment of stock, as the shiners, which had been increasing in the ponds and which appeared to be feeding in competition with the blue gills, and to a large extent on the blue gill fry, had been largely removed the previous year. They had been kept in the ponds as pickerel food, but observation showed that they not only kept down the blue gill production, but were not the main food for pickerel, the latter preferring blue gills.

The number of breeding perch was reduced, as there was ample stock of other fish, and the main production was yearlings and adults grown from left-over stock.

The horned pout production was good, but the main distribution was fingerlings as the stock of larger fish was well reduced the previous year in the belief that an excessive stock of large fish interfered with the production of fingerlings.

Crappie was bred for the first time and gave a large production of good fish, the rate of growth being possibly three times that of blue gills. In May 1,395 brood fish were put in the ponds, and the production of fingerlings exceeded 100,000 for distribution, with over 10,000 retained to grow for future stock.

The ponds are handled as one unit in taking out and distributing fish, as only the Stockwell Ponds have traps for catching. The Sutton-Thompson Ponds feed into the Stockwell Ponds, and so far it has been necessary to drain these into the Arnold Pond, the upper one of the Stockwell Unit, and handle the fish together. The Welsh Pond received no stock, as construction was started during the year, but the flowage from the first construction work received some fish ascending the stream from Lake Singletary and escapes from the Stockwell Ponds above, and yielded a considerable stock of perch, pickerel, and horned pout, taken in a temporary trap. The Sutton Pond was operated its second year, and yielded a full stock of blue gills, crappie, and horned pout. Construction on the Thompson Pond was advanced in time to receive some of the crappie brought in during May, and produced a large stock from a few hundred of these.

The production was good in all of the Stockwell Ponds, but the increase for the year was largely due to the pond flowed by the new dam, construction of which started last year. This proved to be one of the best ponds, although it was flowed to only half the intended level.

Restocking

The same general mixed stock of breeders was returned to the Stockwell Ponds, the blue gills and crappie, largely in the upper ponds on account of their tendency to drift down, but the New Pond and the Fish Pond, received an additional stock of fingerling blue gills, crappie and horned pout, to grow for yearling stock for distribution, and for increase of breeders. These ponds were taken for this purpose on account of the new flowage, and consequent greater feeding capacity.

The Sutton-Thompson Ponds were stocked largely with horned pout, for, if the development of the next year provides a trap for these ponds, this stock can be taken and distributed earlier with the blue gills and crappie, whereas under the present arrangement no great numbers of horned pout are taken until the distribution of blue gills and crappie is nearly finished. The construction of the Thompson Pond was so largely advanced that the area of new flowage will be too large for breeding horned pout safely, and this pond will be used wholly for growing yearling horned pout. So far, the horned pout fry has been found to be the only fish that will not live through a period of excessive fermentation in a newly flowed pond, and the danger of loss comes in a period of excessive heat before it is many weeks old. Larger horned pout and all other fish, except possibly white perch, seem hardy under any condition.

The following stock was placed in the ponds: 267 adult blue gills from the Palmer Hatchery; 200 adult horned pout salvaged from Wood's Pond in Prescott; 1,340 adult crappie or calico bass salvaged from General Butler Ames' Pond in Tewksbury.

Distribution

The distribution was very largely of blue gills and crappie, owing to the great yield of these fish and the necessity for taking them unmixed with other fish, which is accomplished by drawing the ponds at such a rate that they will leave while all other fish remain until the water gets to a lower

stage. During this period they can be handled without loss. In the final work, however, when those remaining come with other fish in mixture (this mixture including the brood stock), the liability of loss is considerable, and consequently it is necessary to take and distribute them without regard to the fish listed. The segregation of fish in certain ponds, and improved facilities for trapping and holding, will eventually make it possible to ship the fish in the proportions desired.

Distributions from the ponds for the period of this report (December 1, 1927, to November 30, 1928) totalled 375,261 fish, as follows: Blue gills—225,310 fingerlings of which 215,750 went to open waters (100 going first to the Eastern States Exposition and 50 to the fair of the Worcester Agricultural Society), 3,450 to club rearing pools, 6,000 to the East Sandwich Fish Hatchery to be held for further growth, 100 to the South Boston Aquarium, and 10 for study purposes; 687 yearlings and adults, of which 640 went to open waters (30 going first to the Eastern States Exposition and 10 to the fair of the Worcester Agricultural Society), 16 for study, and 31 to the South Boston Aquarium.

Horned pout—15,310 fingerlings, of which 14,300 went to open waters, 1,000 to club rearing stations and 10 for study; 16,547 yearlings and adults, of which 16,335 went to open waters (10 going first to the fair of the Worcester Agricultural Society), 200 to pond on the Ayer Game Farm, 8 for study, and 4 to the South Boston Aquarium.

Yellow perch—12,825 fingerlings, of which 12,800 went to open waters and 25 for study; 7,710 yearlings and adults to open waters (of which 30 went first to the Eastern States Exposition).

Crappie—93,250 fingerlings, of which 87,100 went to open waters (100 going first to the Eastern States Exposition and 50 to the fair of the Worcester Agricultural Society), 2,050 to club rearing stations, 4,000 to the East Sandwich Fish Hatchery for further growth, and 100 to the South Boston Aquarium; 29 adults, of which 11 went to open waters (one going first to the Eastern States Exposition and 10 to the fair of the Worcester Agricultural Society), and 18 to the South Boston Aquarium.

Pickarel—535 fingerlings (6 to 9 in.) (525 to open waters and 10 for study); 3,058 yearlings and adults (10 to 16 in.), of which 3,021 went to open waters (6 going first to the fair of the Worcester Agricultural Society), and 37 to the South Boston Aquarium).

FISH AND GAME DISTRIBUTION

FISH DISTRIBUTION

The distribution and transportation of the stock of fish reared at the hatcheries was made almost entirely by the hatchery or salvage trucks, and by trucks sent to the stations by the sportsmen's associations. The movement of this vast amount of fish stock was begun in January, the extremely mild and open winter making access to certain of the brooks possible, and the work was completed about the last of June.

Brook Trout.—By the fall of 1927 each station had selected sufficient of its choicest 1927-hatched fingerlings to carry through the winter for liberation in the spring of 1928 as yearlings.

There were distributed (as by-products) 97,100 fingerlings (4,000 of which were 1927-hatched and 93,100 1928-hatched). It is not part of our plan of distribution to plant fingerling fish; but, in concentrating on the distribution of yearling fish only, there are bound to be some fingerlings and yearlings which must be disposed of in some way to prevent overcrowding of the yearling stock.

There were distributed from all the hatcheries, either to public waters or to the local clubs for further rearing, 247,061 yearling brook trout (of which 234,776 were six inches or over). (See tables of distribution at the end of this section). In carrying a large stock of trout through the winter to become yearlings for spring planting, there will inevitably be a considerable number which, though of yearling age, have not grown to the legal size before the

distribution period is over—this for the reason that all fish do not grow uniformly. We aim to complete the distribution of yearling brook trout each year about May 15, although it sometimes runs longer, owing to weather conditions. As a result there are some yearlings at that time which have not developed to the six-inch size. If these fish were taken by the clubs at that time, carried in ponds or pools and fed well, they should be well over six inches by September first, when they could be planted in public waters, or even held longer. Such an arrangement would eliminate the necessity of planting these undersized yearlings. There is no room to carry them longer at our own stations, for the yearling pools must have a "rest," that is, be sterilized and sunned to insure clean, sanitary conditions preparatory to their use for the young stock coming along through the summer. It is through this medium that the clubs have become interested in establishing rearing pools and carrying fish through until fall, and many have availed themselves of the opportunity. In some instances they have grown trout to a size of 8 to 10 inches. Had they been distributed in the spring at under six inches the stocking would have been much less effective.

There were 959 adult trout distributed to open waters. At the close of the year there are on hand at all the stations 388,770 1928-hatched fingerlings, 9,710 yearlings, and 3,663 adult brook trout.

Experimental stocking of ponds with the large, stripped brook trout was continued in the following ponds: Lake Garfield, Monterey; Onota Lake, Pittsfield; Job's Neck Pond, Edgartown; Lake Archer, Wrentham.

Brown Trout.—Special attention has been given in the past few years to building up a brood stock of selected brown trout, from which we aim to collect annually about 300,000 eggs for the production of fish for planting. We now have such a stock at the Amherst Rearing Station, and it is expected that the above number of eggs will be taken this year.

In addition to completing the selection of this brood stock, 100 fingerlings (used first for display purposes), 8,548 yearling and 500 adult brown trout were distributed to open waters. At the close of the year there are on hand 950 adult and 5,000 yearling brown trout being carried through the winter for further growth and additions to the brood stock, in addition to 11,900 1928-hatched fingerlings.

Steelhead Trout.—The 14,500 steelhead trout fry from the eggs from the U. S. Bureau of Fisheries, were planted in Scorton Creek, Sandwich.

Rainbow Trout.—The only rainbow trout distributed during the year were 6,000 fingerlings and 12 adults. There are on hand at the close of the year 20 adults, 1,800 yearlings and 3,800 fingerlings.

Chinook Salmon.—All the stock remaining from the eggs hatched in December of 1926, consisting of 4,900 fingerlings and 221 yearlings, was distributed in specially selected waters.

An exchange of 50,000 Chinook salmon eggs for brook trout eggs was arranged with the California commission in the fall of 1927, and 50,000 brook trout eggs were shipped to them at that time. Owing to a very bad egg-taking season, the California commission was unable to make a shipment to us; therefore they are to supply them in December of 1929.

White Perch.—All the adult white perch salvaged from Tashmoo Pond on Martha's Vineyard were planted this year in specially-selected, natural great ponds of over twenty acres, and in ponds under twenty acres whose owners had agreed to permit the public to fish them for a period of years. The stocking of such private ponds automatically brings them into that classification of ponds requiring a sporting license to fish them.

Work of the Salvage Unit.—The scope of the salvage work was enlarged by the purchase of sufficient gear, cans and the new large truck to put into the field Salvage Unit No. 2. The truck formerly used by Salvage Unit No. 1 was turned over to the Montague Fish Hatchery, and a new truck purchased. These two units are in the hands of wardens who have grown up in the work of handling fish and in salvaging work of various kinds, and are eligible to transfer to the Fish Culturist classification which will take place in due course.

Progress was made in salvaging fish out of municipal water supplies. Conferences were held with officers of the State Department of Public Health on all phases of the work. One conference was held with such officers and representatives of a limited number of local water boards. The sentiment appears to favor permitting this work to be done in the municipal water supplies; but opposed to any stocking of these water supplies by the Division.

Salvage operations resulted in the collection of 81,404 fish.

From April 4 to 29 Salvage Unit No. 1 operated on Martha's Vineyard collecting white perch from Tashmoo Pond, Tisbury. The work began on April 4 and continued four days, but with poor success. The weather was extremely mild and not at all the kind suitable for catching perch in the headwaters or spring holes. The salvage operations at this pond were discontinued after April 21, after one of the most disappointing seasons the salvage crew has ever experienced, having worked much harder than ever before and with less result. There were 19,000 adult white perch (5 to 7 in.) collected and distributed to public waters.

On April 24 Salvage Unit No. 2 transported its gear to Silver Lake, Halifax, Kingston, Plympton and Pembroke (water supply for the city of Brockton), at the request of the sportsmen of the latter city. They operated here from April 24 to 30. Having fished the lake at six of the most likely spots, and having collected only 500 suckers, 1 bass, 20 yellow perch and 1 pickerel (all of which were returned to the lake), the gear was pulled on April 30 as it did not seem profitable to continue the work with the poor results obtained.

From May 14 to 24, salvage operations were carried on at General Butler Ames Pond, Tewksbury, and the following fish collected: 4,590 yearling and adult crappie or calico bass (5 to 15 in.) (3,200 planted in public waters, 1,340 sent to Stockwell Ponds for additions to the brood stock, and 50 to the South Boston Aquarium); 2,700 adult horned pout (10 to 15 in.) (2,650 planted in public waters and 50 to the South Boston Aquarium); 3,895 yearling and adult blue gills (4 to 9 in.) (3,820 planted in public waters and 75 sent to the South Boston Aquarium); 7 adult small-mouth black bass (10 to 16 in.) sent to the South Boston Aquarium.

From May 29 to June 4 Salvage Unit No. 1 operated at North Watuppa Pond, Fall River (water supply for Fall River). The following fish were collected and planted in local waters: 2,068 adult yellow perch (8 to 14 in.); 11,005 adult white perch (9 to 13 in.); 2,419 adult small-mouth black bass (8 to 22 in.); 2,476 adult horned pout (8 to 14 in.); 78 adult pickerel (15 to 27 in.); 31 adult pike perch (17 to 24 in.).

From June 2 to 14 Salvage Unit No. 2 operated at Ludlow Reservoir, Ludlow and Belchertown (water supply for Ludlow), and collected the following fish, which were planted in local waters: 740 adult small-mouth black bass (7 to 18 in.); 841 adult horned pout (7 to 14 in.); 1,365 yearling and adult yellow perch (6 to 14 in.); 37 adult pickerel (8 to 17 in.); 26 adult sunfish (6 to 7 in.).

From June 12 to 21 Salvage Unit No. 1 operated at Long Pond, Falmouth (water supply for the town of Falmouth) at the request of the town officials, who paid all expenses, and the following fish were collected and planted in ponds in Falmouth: 1,300 adult small-mouth black bass (8 to 16 in.); 825 adult yellow perch (8 to 13 in.).

From June 21 to 29 Salvage Unit No. 2 operated at Meeting House Pond, Westminster, and Wachusett Lake, Princeton and Westminster (water supplies for the city of Fitchburg) and collected from Meeting House Pond 75 adult small-mouth black bass (7 to 20 in.); and from Wachusett Lake, 200 yearling and adult pickerel (4 to 20 in.); 605 adult yellow perch (7 to 11 in.); and 195 adult horned pout (8 to 14 in.). All these were planted in local ponds.

From June 25 to July 2 Salvage Unit No. 1 operated at Great and Little Quitticas Ponds, Middleboro, Lakeville and Rochester (water supplies for the city of New Bedford) and collected the following fish, which were planted in local waters: 245 adult small-mouth black bass (12 to 21 in.); 130 adult

white perch (10 to 15 in.); 210 adult yellow perch (8 to 13 in.); 155 adult horned pout (8 to 13 in.); 56 adult pickerel (14 to 23 in.).

From July 10 to July 14 Salvage Unit No. 1 operated at Wenham Lake, Wenham and Beverly (water supply for Beverly and Salem) and collected the following fish, which were planted in local waters: 533 adult white perch (12 in.); 70 adult small-mouth black bass (14 to 19 in.); 35 adult pickerel (16 to 23 in.); 56 adult yellow perch (10 in.); 6 adult horned pout (12 in.).

From October 2 to October 8 Salvage Unit No. 1 operated at Crystal Lake, Wakefield (water supply for Wakefield) and collected the following fish, which (with the exception noted) were planted in Quannapowitt Lake, Wakefield: 966 adult small-mouth black bass (9 to 21 in.); 112 adult pickerel (10 to 24 in.); 1,370 adult horned pout (10 to 13 in.); 330 yearling and adult yellow perch (6 to 12 in.); 275 adult white perch (8 to 12 in.); 310 yearling and adult sunfish (4 to 9 in.). There were 34 adult small-mouth black bass (9 to 21 inches) collected and sent to the Palmer Fish Hatchery for addition to the brood stock.

From October 9 to 15 Salvage Unit No. 1 operated at Artichoke Basin, Newburyport and West Newbury (water supply for Newburyport) and collected the following fish, which were planted in local ponds: 315 adult pickerel (14 to 22 in.); 747 adult horned pout (8 to 11 in.); 957 adult white perch (8 to 10 in.); 110 adult small-mouth black bass (10 to 18 in.); 1 adult pike perch (24 in.).

The owners of the Oakes Ames Estate in North Easton drew down their pond, and permitted Salvage Unit No. 1 from November 9 to 11 to collect the following fish (in exchange for which the Ames Estate will receive stripped adult brook trout). The fish collected were planted in local waters, as follows: 2,300 yearlings and adult pickerel (8 to 20 in.); 1,000 yearling and adult horned pout (7 to 10 in.).

Several small salvage jobs were accomplished and the fish planted, in most cases, in local ponds, as follows:

From Cranberry Burrage Bog, Halifax, 425 fingerling ($1\frac{1}{2}$ to 2 in.) and 425 yearling and adult blue gills (3 to 5 in.); 340 fingerling ($1\frac{1}{2}$ to 2 in.) and 340 yearling and adult sunfish (3 to 5 in.); and 40 fingerling (3 to 4 in.) and 45 yearling and adult (8 to 14 in.) pickerel.

From Millers River, South Ashburnham, 3,000 yearling yellow perch (4 to 7 in.).

From Meeting House Pond, Westminster 123 adult small-mouth black bass (10 to 18 in.) were collected and turned over to the U. S. Bureau of Fisheries, and 96 adult small-mouth black bass (10 to 16 in.) were distributed to open waters.

From Meadowbrook Flowage Basin, Amesbury, 3,900 fingerling pickerel (4 in.); 650 yearling and adult white perch (4 to 12 in.); 4,200 yearling and adult yellow perch (4 to 10 in.); 30 adult crappie or calico bass (12 in.); 35 adult horned pout (6 to 12 in.); and 35 adult blue gills (6 to 8 in.).

From Norton Reservoir, Norton, 58 adult small-mouth black bass (12 to 20 in.); 75 fingerling pickerel (3 to 4 in.); 30 yearling pickerel (5 to 8 in.); 105 adult pickerel (8 to 15 in.); 35 fingerling yellow perch (3 to 4 in.); 105 adult yellow perch (6 to 10 in.); 37 yearling and adult horned pout (4 to 10 in.).

From Woods Pond, Prescott, 652 adult pickerel (8 to 20 in.); 1,622 adult horned pout (6 to 9 in.) were collected (which were held for a time at the Palmer Fish Hatchery and later distributed to public waters) in exchange for which Mr. Wood will receive yearling brook trout. From this pond also 200 adult horned pout (6 to 8 in.) were collected for addition to the brood stock in the Stockwell Ponds.

Small-mouth Black Bass.—The entire production of small-mouth black bass at the Palmer Fish Hatchery, 277,500 fry, 16,652 fingerlings and 10 adults, was planted in the following specially selected waters: Cliff Pond, Brewster; Lawrence Pond, Sandwich; Wakeby Lake, Mashpee; Lake Garfield, Monterey; Ashmere Lake, Hinsdale; Lake Buel, New Marlboro; Lake Gardner, Amesbury; Chebacco Lake, Essex and Hamilton; South or

Harris Pond, Methuen; Ashfield Pond or Great Pond, Ashfield; Hazzard Pond, Russell; Chapin Pond, Ludlow; Congamond Lakes, Southwick; Hampton Ponds, Westfield and Southampton; Arcadia Lake, Belchertown; Norwich Lake, Huntington; Goshen Reservoir, Goshen; Quannapowitt Lake, Wakefield; Lower Mystic Lake, Arlington; Peters or Mud Pond, Draeut; Long-Sought-For Pond, Westford; Farm Pond, Sherborn; Lake Pearl or Whittings Pond, Wrentham; Whitman Pond, East Weymouth; Stetson Pond, Pembroke; Mary's Pond, Rochester and Marion; Big and Little Island Ponds, Plymouth; West Pond, Plymouth; Billington Sea, Plymouth; Lake Lashaway or Furnace Pond, East Brookfield; Lake Chauncy, Westboro; Big Alum Pond, Sturbridge; Lake Wickaboag, West Brookfield; Monomnock Lake, Winchendon; Long Pond, West Rutland.

Those bass taken in miscellaneous salvage jobs were planted in ponds near the locations where the fish were taken.

Large-mouth Black Bass.—The only distribution was two adults from the supply pond (which went first to the Eastern States Exposition).

Horned Pout, Blue Gills, Pickerel, Yellow Perch, Crappie (Calico Bass).—An unusually large stock of native pond fish was distributed from the Stockwell Ponds in addition to horned pout from the Palmer Hatchery, 1,000 yearling pickerel (4 to 8 in.) purchased from the League of Franklin County Sportsmen Clubs (produced in a pond leased by them) and the fish collected in the various salvage operations.

Muskallonge.—40,000 muskallonge fry were received from the New York Conservation Commission and planted in the Connecticut River at Montague.

Alewife.—The following depleted breeding grounds were stocked with adult alewives, collected in streams where they were running in good numbers: Lake Nippinicket, Bridgewater, 1,485; Town River above the Stanley fishway, Bridgewater, 250; West Monponsett Pond, Halifax, 905; East Monponsett Pond, Halifax, 670; Robbins Pond, East Bridgewater, 605.

Fish Distribution to Public Waters, 1928

	Product of State Hatcheries	Not Hatchery Product (Seining, gift, purchase, etc.)
Brook Trout:		
Fingerlings ¹	—	—
Yearlings (under 6 inches)	5,360	—
Yearlings (6 inches or over)	228,301	—
Adults	959	—
Brown Trout:		
Fingerlings	100	—
Yearlings	8,548	—
Adults	600	—
Rainbow Trout:		
Fingerlings	6,000	—
Adults	12	—
Steelhead Trout:		
Fry	14,500	—
Chinook Salmon:		
Fingerlings	4,900	—
Yearlings	221	—
Small-mouth Black Bass:		
Fry	277,500	—
Fingerlings	16,652	—
Yearlings and adults	10	6,079
Horned Pout:		
Fingerlings	22,300	—
Yearlings and adults	16,335	11,134
Yellow Perch:		
Fingerlings	12,800	35
Yearlings and adults	7,710	12,764
White Perch:		
Adults	—	32,550
Blue Gills:		
Fingerlings	215,750	425
Yearlings and adults	805	4,280

¹ 97,100 fingerlings were distributed as a by-product in the production of yearling stock.

Fish Distribution to Public Waters, 1928—Continued

	Product of State Hatcheries	Not Hatch- ery Product (Seining, gift, purchase, etc.)
Pickereel:		
Fingerlings	547	4,015
Yearlings and adults	3,105	4,965
Muskallonge:		
Fry	—	40,000
Crappie or Calico Bass:		
Fingerlings	87,100	—
Yearlings and adults	11	3,230
Sunfish:		
Fingerlings	—	340
Yearlings and adults	—	676
Alewives:		
Adults	—	3,915
Miscellaneous:		
Large-mouth Black Bass adults	2	—
Pike Perch adults	—	32
	930,128	124,440

Fish Distributed to Clubs for Rearing to Larger Size before Liberation

	Fingerlings	Yearlings
Brook Trout:		
Peabody Fish and Game Association	—	2,000
Haverhill Sportsmen's Club, Inc.	—	600
Orange Gun Club	—	1,000
Western Massachusetts Rod and Gun Club and Shelburne Falls Chapter	—	—
I. W. L. of A.	—	1,000
Northfield Fish and Game Association	—	500
Westfield Chapter, I. W. L. of A.	—	2,000
Woronoco Rod and Gun Club	—	1,800
Concord Rod and Gun Club	5,000	—
Wrentham Sportsmen's Association	—	1,000
Plymouth Chapter, I. W. L. of A.	—	600
Clinton Fish and Game Protective Association	10,000	—
Worcester County Fish and Game Association	50,000	—
Fitchburg Chapter, I. W. L. of A.	7,000	600
Leominster Sportsmen's Association and	—	—
Leominster Chapter, I. W. L. of A.	—	1,800
West Brookfield-Warren Chapter, I. W. L. of A.	—	500
Blue Gills:		
Clinton Fish and Game Protective Association	450	—
Worcester County Fish and Game Association	3,000	—
Crappie:		
Clinton Fish and Game Protective Association	50	—
Worcester County Fish and Game Association	2,000	—
Horned Pout:		
Worcester County Fish and Game Association	1,000	—
	78,500	13,400

GAME DISTRIBUTION

Pheasants.—In December of 1927 and January, 1928, the beginning of the fiscal year, 386 pheasants (1927-hatched and classified at that time as adults) were distributed to 11 clubs and 5 individuals to be carried through the winter.

There were 12,711 eggs for hatching shipped to sportsmen's clubs and individuals. This year again we were unable, by several thousand, to supply the full number applied for. Those who received eggs hatched 5,280 young pheasants, of which 1,604 were liberated in open covers and 511 are being carried by them through the winter.

There were 318 young pheasants liberated (203 of these were sent to the clubs with the understanding that they were the club's allotment of wintered birds, and that if they wished to use them for field trials they might do so). This was the smallest number of young birds liberated in open cover in any year.

Of the approximately 250 clubs in the State, 95 (and 19 individuals) agreed to carry young pheasants from our game farms through the winter in pens for liberation as adult stock the following spring, and these clubs and individuals were furnished 5,884 birds for this purpose (60 of which were purchased from a dealer).

The local sportsmen's associations and chapters of the Izaak Walton League are rearing State birds and fish, and showing greater interest than ever before doing this work.

The process was begun of inspecting all quarters where pheasants are being held for us through the winter, and likewise the birds themselves after delivery. As time permits, all such quarters will be inspected to make certain that the stock is being properly cared for in quarters of sufficient size and under sanitary conditions.

There were 501 adult pheasants liberated (488 of these being discards from the brood stocks at the game farms and from the Ayer egg stock, and 13 purchased from a private dealer). All adult pheasants liberated were banded.

At the close of the year there are on hand at the four game farms 2,390 pheasants (1928-hatched) and 1,005 adults, for brood stock and spring liberation.

White Hares.—The Division was successful in importing this year from Maine, 1,984 white hares, a much larger number than ever before, of which 1,970 were liberated. (Of the 66 retained in one of the large brailing yards at the Wilbraham Game Farm for liberation after the close of the shooting season, 14 died). Before any white hares were distributed, every club was circularized to ascertain if their respective sections contained suitable cover, and shipments were made only to clubs indicating such.

Cotton-tail Rabbits.—Penikese Island yielded 295 cotton-tail rabbits, with a very good brood stock remaining on the island. At the present time the island is our only source of supply. These animals are shipped into sections where white hares are not present.

Game distributed to the Covers, 1928

	Product of State Hatcheries	Not Hatch- ery Product (Purchase, Gift, etc.)
Pheasants:		
Young (reared from the 12,711 eggs distributed for hatching) . . .	1,604	—
Young	318	—
Adult	488	13
Cotton-tail Rabbits:		
Adult	295	—
White Hares:		
Adult	—	1,970
	2,705	1,983

Pheasants Distributed to Clubs and Individuals to be Reared to Adults for Spring Liberation

	Product of State Hatcheries	Not Hatch- ery Product (Purchase, Gift, etc.)
Adults (1927 hatch) carried through the winter of 1927-8	386	—
Young (1928 hatch) to be carried through the winter of 1928-9	5,824	60
Young (1928 hatch) reared by clubs and individuals and carried through winter of 1928-9	511	—
	6,721	60

MARINE FISHERIES

GENERAL

The progress in the rehabilitation of the fisheries industry which was noted last year continues unabated. There has been reorganization of some of the larger units. A number of additional trawlers have been added to the fleet. These boats represent the most advanced ideas as to comforts of crews, speed to make possible short trips, radio communications with markets and sanitary conditions of handling which insures the highest quality of fresh fish. The scientists, the engineers and the practical men of the industry are making the most serious efforts to give the public a commodity that is in a perfect state of preservation, packed for immediate use without the past inconvenience of preparation and distributed over an increasing territory. The remotest districts in our country can now have fresh salt water fish products with as much ease as those located near our fish receiving ports.

Organization of the Massachusetts Fisheries Association is evidence that the men within the industry realize that in keeping with other industries, team work is essential to development. It also makes for sane and intelligent leadership and the standardization of trade practices so indispensable to any well ordered business.

We continue to express the hope that this splendid record will be increasingly recognized by the State and a larger measure of assistance will be given to this industry. In common with agriculture it is engaged in giving our people a balanced food ration. When once the food values of all sea products are more fully appreciated by the people of our country this industry will assume the position of great importance to which it is entitled.

Other industries may come and go, but by reason of our proximity to the fishing grounds this industry will be with us always. For this reason we should take great interest and pride in assisting its development wherever possible.

INSPECTION OF FISH

Sincerely we regret being obliged to record the demise on November 6 of Captain Jerry E. Cook of Gloucester, deputy inspector of fish. Captain Cook had been associated with us but a year and a half, and yet, in his passing, left with us all the indelible impress of a genial, capable public servant, a true son of the sea, one who daily gave evidence of real knowledge of the duties of his position, coupled with the kindly firmness necessary to carrying out understandingly the laws of the Commonwealth as applied to his duties.

The work of inspection of fish was introduced under Governor Coolidge in 1919 and has been extensively followed ever since. In some of the early years it was deemed necessary in order that the people and the fish dealers might be fully acquainted with the work and the seriousness of the proposition which it sought to present, to go into print as widely as possible, and therefore some of the annual reports were of considerable length.

It is a pleasure therefore at this time, after nine years of intensive work, to find that the inspector of fish feels that the idea of quality fish is so well grounded in the minds of the fish dealers and the public alike that it is necessary to say but little more than to report the work of the office during the past year.

The inside work of the office has been along the same lines as laid down several years ago, namely to cover the greatest amount of retail stores the greatest number of times possible during the year and also to cover the great wholesale marts such as the Boston Fish Pier, Atlantic Avenue and Gloucester as frequently as possible and also all the other leading fishing ports of the State. This office has always set for its task that all retail stores should be covered three times in a year, while the wholesale places of Boston and

Gloucester above mentioned, should be looked over at least once daily, together with the catches of the vessels that land thereat.

As far as the retail stores are concerned it was found simply impossible to make a regular three-a-year-plan go over, but it can be safely said that 90% of the retail stores of the State are inspected three times during the year and some of them, where it was believed necessary, were subjected to more inspection during the year. It is not known of any store which has not received at least two visits from some inspector from this office during the year.

It is natural to suppose that this report is written for the information of the public and therefore it might be well to state that taken as a whole there is a splendid indication of a more general desire than ever noted before on the part of the retail dealers to keep their goods up to high quality condition.

For a long time the quality proposition has been sold to the wholesalers; indeed some of these firms vie with one another as to whose goods shall be even exceeding those of the others and yet all of them in the A 1 class.

From the above optimistic statements it is not to be inferred that some fish of unfit quality is not found in dealer's hands, when it is considered that with only three men something like 250 million pounds of fish have to be actually looked over in the run of the year and then that these fish have to go out to the retail stores afterward.

Outside of the regular work of the office the individual calls are innumerable and yet despite the fact that inspectors are practically working to the limit of regular assignments, an effort has been really made to meet each case intelligently. It might be said here that the activities of this office and the scope to which they could be widened are measured only by the size of the appropriation set apart for carrying on the work.

There are many specific instances of the value of this fish inspection work that might be quoted in this annual report that would actually appeal to the public and demonstrate the value of its work, but the inspector feels that the public and the dealers are both in such accord as to the worth of the work that little is necessary to be said.

We are pleased that our slogan of "quality fish only" has been successfully sold both to the fish dealers of the State and to every family that uses Massachusetts caught fish.

The following table shows some of the work accomplished during the year 1928:

Inspections in retail stores, 3,492.

Inspections in wholesale stores, 21,259.

Freezer inspections, 318.

Inspection of pedlar's carts, 205.

Inspection at Yarmouth, N. S., steamer, 235.

Vessel inspections at Gloucester, 282.

General inspection trips, 7.

Fish condemned at Boston Fish Pier from vessels, 43,065 pounds.

Fish condemned at Gloucester direct from vessels, 11 swordfish, 2,200 pounds.

Fish condemned at retail stores, 3,421 pounds.

Condemned at Boston Fish Pier from consignments on Yarmouth, N. S., steamer; graded as "jellied" 28 fish; 8,673 pounds.

Condemned, landed at Boston from Canada by rail and steamer, 1,812 pounds fresh fish; 5,032 pounds lobsters.

Condemned, landed at Boston Fish Pier arrived by rail, 3,335 pounds.

Condemned, landed at Boston Fish Pier, direct, graded as "jellied" 64 fish; 15,269 pounds.

Total condemned at Boston Fish Pier, and at Boston from Canada by rail and steamer, 70,816 pounds.

Total inspections, 25,798.

Total fish condemned, 153,623 pounds.

Total court cases, 40.

* Total convictions, 39.

* One case pending.

THE DEEP SEA FISHERIES

It seems to be almost becoming a habit to report increasing prosperity and larger catches for the off-shore vessels of the Massachusetts fleet and yet this year this is more particularly in evidence than for a long time; indeed it is doubtful if in all the history of the fisheries of the Old Bay State there ever was a year when the landings at all its ports fetched up to such a large total. And it is equally true that with the greatly increased number of trips, which means less time taken on the fishing grounds and therefore fish landed in better condition with the natural consequence of higher prices, that the largest money return was made to the fishermen and vessel owners on record. These statements are made, not only having in mind the record landing at the Boston Fish Pier, which broke all previous returns, but at Gloucester and also at the outlying ports, such as Provincetown, Woods Hole, New Bedford, etc. Indeed it might be called a fishing year par excellence.

While a decline in the catch of mackerel is noted and also a falling off in the catch of halibut, coupled with the not too disturbing fact that haddock reigned supreme over codfish as far as landings are concerned, it is interesting to note that the catch of swordfish was one of the largest on record, that the haddock return surpassed all previous figures, that the results of all other sorts of groundfishing, excepting halibut, showed an increase over the previous year, there is little left to worry about, with the possible exception of leaving in the minds of fishermen and dealers the need of a statistical survey which would set at rest the present day expressed fears that such inroads as are being made upon the haddock and flounder supply on the various banks may place these species in danger of, to say the least, disturbing diminution.

The halibut catch on the Atlantic banks admittedly is quite a bit less than last year and this with about the same number of vessels operating. Here also comes the question which has been brought up for several years as to whether some sort of conservation measure is necessary to preserve and perpetuate the fishery of this species, the catch of which for several years has been so slim as to place this fish in the luxury class. This statement is made having in mind the fact that on the Pacific coast, where the landings although now somewhat like fifteen times the total amount landed from the Atlantic banks, yet have shown such an alarming decline as to need by international agreement a close season of about three months which has been rigidly observed for two or three years, and it is claimed, with beneficial results, and which still continues in force.

The haddocking fleet which naturally makes its landing center at Boston produced a record year notwithstanding that the season opened in December of 1927 with very bad weather which brought high prices for the trips landed. Bad weather, in fact unusually bad weather, persisted during the whole month of December which made for very small catches and very high prices. The week ending December 23 produced the lightest landings for the whole year. With the opening of the New Year the weather moderated and trips increased in proportion with prices averaging fair, but towards the latter part of the month very severe weather again obtained which produced light receipts with the result of very high prices indeed, codfish ranging \$15 per hundred weight and haddock \$14.50. It is interesting to note during this period (the latter half of January) that in 1927 the weather was unusually mild, the receipts were unusually large and that a great many hundred thousand pounds of fish went to the splitters and smokers.

As a general proposition the weather continued bad during February, but fares were in generous proportion and prices high. So bad was the weather that in the latter part of February vessels ten days out from the Pier were able to set their trawls but two days on Georges. When they did set them they made good hauls and prospered on account of the high prices. In March good catches were made in South Channel and Georges and during this month the second largest receipts of the year were registered at the Boston Fish Bureau and prices reached their lowest level since the middle of

January. During the latter part of March, on one day 1,368,000 pounds of groundfish were taken out at the Fish Pier. This was the largest amount taken out for a long time in one day, the record being held on March 18, 1926, when 1,630,110 pounds were discharged. It is to be understood that these figures apply only to groundfish.

From this time on better weather obtained, the fleet was somewhat disseminated by some crafts entering the mackerel fishery and other lines of fishing, but it is worthy of note that the summer receipts at the Pier held up better than usual, that prices averaged higher than usual and that at all times there was a good call for fresh fish, due no doubt to the wonderful demand for fillets.

These increased landings at the Boston Fish Pier with the accompanying good prices had its material effect in decreasing the size of the fleet operating during the summer months on the eastern banks for capacity fares for splitting. These crafts, at the start of the season, found fish scattered and scarce and to obtain a paying voyage was almost out of the question. For this reason the eastern fleet was reduced in numbers and although during the latter part of the season the "school" fish were found in goodly numbers and many splendid trips made, yet the season to the eastward, notwithstanding that the prices were raised at least three times, could not be considered as a successful one in the light of the splendid prices with the quick trips from Georges and South Channel were meeting practically daily at the Boston Fish Pier.

The fresh halibut season was opened on January 7 by the sailing of the schooner *Catherine* from Gloucester. Previous to this, small lots of halibut had been brought in by the winter haddockers with sales quoted ex-vessel all the way from fifty cents to one dollar a pound. Of course these prices were for small lots. During March the halibut fleet landed some splendid trips and prospered accordingly, the prices fluctuating from fair to high and the vessels coming from St. Peters, Grand Bank and The Gulley. From this on there was a noticeable decline in the general size of trips landed, although now and then the season was punctuated by some exceptional fares. With the arrival of fresh bait quite a number of the fleet resumed operations on Georges and Brown's Bank, but as a general proposition the trips brought in from these grounds, although made in quick time and of the finest quality were small in size, while the vessels to the eastward seemed to fare better as a general proposition, although of course they took more time on their trips and their fares were of larger size generally speaking.

The gill netting fleet which centers its operations at Gloucester had a good year. During the winter of 1927 and 1928 catches were not very large, but prices to a certain extent compensated. During the time while the pollock school was on, all the crafts fared well. During the spring naturally there were only small hauls in which cod predominated. Some of the crafts continued to operate throughout the summer and as the fall and winter fleet numbered about fifteen sail, this was naturally reduced to a very few. However, with the opening of the fall season of 1928 the crafts in operation found fish in such goodly quantities and met with such splendid prices that others quickly followed into this line of fishing with the result that in December at least 20 or 25 boats were engaged profitably in this line of fishing.

The fleet fishing for flounders and which markets at Boston, Provincetown, Nantucket, Woods Hole, New Bedford and New York prospered well. Last year the total landings at these various mentioned ports by Massachusetts crafts alone totaled some twenty-two million pounds of this one delectable fish and it is felt that when the balance is struck for the year 1928 even this magnificent total will be exceeded. Naturally, there were times of glut when prices were at a minimum, but also by the same token there were opportune times when fortunate vessels found a bare market and profited exceedingly, but throughout the whole season as a general proposition it was a "profitable voyage" for all engaged in this industry. These crafts at the present time in pursuit of their calling cover the fishing grounds from

Thatcher's Island, along the coastal banks into Nantucket and Vineyard Sounds and on the outside along Nantucket Shoals and even onto Georges Bank in the vicinity of the Cultivator Shoal and other well known fishing spots in that vicinity. In other words the larger crafts fishing for flounders have at times in order to secure paying voyages to visit some of the most dangerous fishing spots known to the Atlantic coast, hence the danger of this particular line of fishing can be readily realized. This office has for two years been assisting the United States Bureau of Fisheries to the extent of collecting and collating statistics regarding the catch and landings of this flounder fleet, this being done to back up an expressed opinion that unless the matter of flounder fishing was carefully looked into by the experts of the United States Bureau we were in danger of depleting what at the present time is a wonderful marine resource.

The fleet of crafts which went to the Treaty coast of Newfoundland from Gloucester, to Bay of Islands and Bonne Bay during the fall and winter of 1927 and 1928 secured capacity cargoes of salted herring and some brought home fares during February of frozen herring from Fortune Bay, Newfoundland, there being at least three cargoes of the latter sort, these being landed mostly in Newfoundland bottoms, although it is commonly understood that the crafts were under American charter. This present fall, owing to the greatly increased demand for salted herring, the number of crafts engaged in this business was greatly increased. Herring were found in good abundance at Bay of Islands with the result that many and quick trips were made and this branch of the fishing industry gives evidence of only coming back more into its own, the same as of 15 to 20 years ago, when some 50 to 60 American vessels engaged in this most hazardous enterprise.

Mackerel Fishery Pursued with Profit

The mackerel fishery, pursued by the vessels of Massachusetts ports covering fishing grounds reaching from the Capes of Virginia to the Bay of Fundy, was pursued with profit during the spring, summer and fall season of 1928 and although the total catch failed by some fifty-five thousand barrels to reach that of the previous year, and was also one hundred and five thousand barrels short of the record year of 1926, yet by reason of splendid judgment used in marketing the catches there were very few times when a glut in the market became apparent and unusually low prices prevailed. Indeed so careful was the business end of the mackerel fisheries proposition worked out that although the public was not called upon to pay exorbitant prices at any time, yet a happy medium was maintained by reason of which vessel owners, captains and fishermen were quite adequately recompensed for their labors and the public in general was not overcharged for its goods. In other words, it has been figured out that notwithstanding the shortage of catch as compared with the previous year that those directly interested in the mackerel end of the fishing business did fully as well financially as in the previous year. It seemed to be simply a matter involving the proper business handling of one of the most interesting branches of the fisheries industry and it is the opinion of unbiased judges in the fisheries game that the selling and handling was properly looked out for, with due regard to both seller and consumer.

With due deference for the "darks" the fleet this year made a later getaway than last year, the first sailing being the schooner *Santina D.* which left Boston on April 2 from the port of Boston. The putting of her prow in the direction of southern waters was quickly followed by a large bunch of crafts from Gloucester and some from Boston and then the season could have said to have been fairly opened.

The first fare of the season was landed at Cape May by the schooner *Stiletto*, Captain Howard Toby, which ran in with 3,000 pounds of fresh mackerel caught 25 miles southeast of Winter Quarter Lightship, the sale at Cape May being at 35 cents a pound, the date of the arrival being April 12. The early report from the southern seiners was to the effect that the

weather had been bad and the sea unusually rough, which had greatly hampered seining operations.

The southern fleet, however, after the change of weather, fell into good fortune and many fine catches were made. But after a few days bad weather again set in and mitigated against the success of the fleet as a whole, so much so that when many of the fleet arrived home early in May to refit the southern record of catch was only 13 thousand barrels as against 41 thousand at the same time for the previous spring.

Very few vessels took a chance and went to the Nova Scotia cape shore and the general judgment of the fleet was borne out by the fact that as soon as good weather set in, catches in southern waters began to look up and such success did attend the operations of the fleet that by the middle of May vessels from the southern grounds were landing their fares in Boston from the grounds off Long Island and Block Island. The marked success, following the good weather which came in May, continued to such an extent that by June 1 the total landings of the fleet exceeded 45,000 barrels which was encouraging as compared with the blue outlook at the start. During this time the mackerel netting fleet to the southward had prospered also greatly, indeed it might be stated here that the schooner *B. T. Hillman* landed one trip of 33,000 pounds which is credited to be the largest fare ever landed by the mackerel netter.

The first arrivals in Boston from the Cape Shore came on June 6, the fares being taken off Sambro in the vicinity of Halifax. Along with these fares came the report that but very few vessels of the American fleet were fishing on the cape shore, the shore fleet continuing to land very fine fares, all the fish being taken in the waters contiguous to Block Island, No Man's Land, and Long Island, although some fish were showing between Cape Ann and Cape Cod and fairly decent hauls were being made. During the latter part of June some good fares were brought in and on Monday, June 18, the Boston Fish Pier had one of its largest mackerel days on record, when a total of 1,046,000 pounds of fresh mackerel were landed.

About this time small mackerel began showing, weighing about one-half pound each, in Cape Cod waters, but there later appeared to be no body to this school of fish. "Bull's-eye" mackerel, however, began to put in appearance in unusual quantities and this species of mackerel were found in abundance from Cape Cod to Long Island during the whole rest of the season. Owing to the fact that they are not highly regarded in the market they brought but small prices and often it became necessary for the vessels and traps to dump their catches overboard rather than take the time to run them to market.

Good catches prevailed throughout June, also the early part of July, although foggy weather and heavy seas were met with at times. Yet in spite of these handicaps the season progressed so satisfactorily that by the latter part of July the total catch of the fleet had reached the impressive figure of 150,000 barrels as compared with 185,000 barrels during the previous year. From that point on, however, foggy weather and other adverse elements prevailed against an increased catch and the landings of the fleet declined materially. Naturally there were spurts, but as a general proposition the catch of the fleet showed a noticeable falling off.

Some fish were found on Georges, but the main body of fish which had been apparent through July and August in South Channel and on Nan-tucket Shoals, and also Massachusetts Bay and some along towards Boon Island and the Maine coast, was not in evidence and the season which continued with more foggy weather sort of gradually petered out, although a large body of mackerel were reported on Georges Bank and so wild that it was almost impossible to make any paying catches. Into September the mackerel fleet were faced again by stormy weather and many who had been on Georges were forced to seek port. Squalls continued to hamper fishing operations and the vessels were in port most of the time, so that coming into October found the fleet making few or little hauls, and while some returned to the Block Island region in hopes of catching returning

schools of fish, they found but bull's-eye awaiting for them, which, as has been said before, had little standing in the market; this with the effect that by the latter part of October most of the mackerel seining fleet had given up operations, although some few still stuck to it and made a few hauls off Race Point, Cape Cod.

The mackerel netting fleet, which began operations with Gloucester as its base during the middle or latter part of October, had one of the most prosperous seasons in its history. The fleet, which was small at first, was greatly increased because of the success attending the vessels that went into the game early and before its close, about the middle of December, was increased to fully sixty crafts. These vessels fished from 25 to 35 miles southeast of Thatcher's Island and intercepted the schools from the Gulf of St. Lawrence on their annual return to southern waters, meeting with marked success and with the result that the small crews fared finely financially. Some very large fares were landed, as high as twenty and thirty thousand pounds being brought to port by a single craft and the unusual occurrence of mackerel in November and December being in such quantities that the wholesale fresh fish markets could not absorb them all and part of the fares had to go to the splitters at a fairly good price. This was witnessed on at least two occasions for the first time in the memory of the habitues of the wharves.

As stated above, the mackerel season while short in catch, was long on price and must have been satisfactory to all concerned in mackerel operations afloat and ashore.

The Massachusetts catches of fresh and salted mackerel from December 1, 1927, to November 30, 1928, inclusive, and for the corresponding period of the three previous years, were as follows:

	Dec. 1, 1927 to Nov. 30, 1928	Dec. 1, 1926 to Nov. 30, 1927	Dec. 1, 1925 to Nov. 30, 1926	Dec. 1, 1924 to Nov. 30, 1925
Salt Mackerel (Bbbs).	352	1,002	5,380	12,442
Fresh Mackerel (Bbbs.)	199,565	252,962	304,385	203,961
Total	199,917	253,964	309,765	216,403

Cape Shore Catches of Mackerel for Eight Years

Year	Arrivals	Fresh Mackerel (Pounds)	Salt Mackerel (Barrels)
1928	8	385,000	19
1927	3	155,000	3
1926	53	2,397,700	1,310
1925	34	1,545,000	1,075
1924	24	996,000	854
1923	31	1,240,680	211
1922	48	1,353,900	2,344
1921	29	2,160,000	3,003

Improvement in Bluefish and Striped Bass Catch

It seems fairly well indicated from reports all along Vineyard Sound and Buzzards Bay and also the inner side of the Cape as far up as and including Brewster, that bluefish and striped bass are slowly but surely returning to these waters in what can be considered profitable numbers. This report follows close upon the improvement noted, especially in the bluefish take of 1927, and from individual reports at many points along the waters indicated comes stories which are to say the least heartening to those to whom bluefishing and striped bass taking means so much, not only from a business but from a sporting angle. Warren A. Burgess who operates traps at Brewster and who last year made a splendid report of takes of nearly 16,000 pounds of bluefish and 3,386 pounds of striped bass for the season, writes

that in his opinion the striped bass are getting more plentiful every year and also that in his traps this year he took some bluefish that weighed from two to six pounds, although not as large a total catch as last year. This report should not be discouraging, however, for Mr. Burgess plainly states that there were more bluefish and striped bass taken in Vineyard Sound this year than last and that snapper blues were found in large quantities all along the coast. He looks upon this as a good sign that bluefish will be much more plentiful next year, although he admits that they are very shy and hard to take by handline.

Besides the reports of Mr. Burgess this office has also received from others who are greatly interested in bluefish and striped bass fishing reports which are most encouraging. In Buzzards Bay, for instance, there was a marked increase in the take of striped bass, especially in the traps, and advices from Buzzards Bay, which in former years was considered the home of the bluefish, comes the report that for the first time in twenty years large bluefish weighing from three to seven pounds had been taken in goodly sporting numbers on the hook. There are also reports of large hauls by sweep seines for striped bass being made in the Bay.

At Chatham, one correspondent tells us of a catch by sweep seine of over 2,200 pounds of striped bass at one haul, the fish weighing from 5 to 40 pounds each and marketing at thirty-two cents a pound in New York. It is also averred that in one day 12,000 pounds of these splendid fish were taken at Chatham and also that more were caught this fall than ever were caught before in a period of five years, which certainly is a most encouraging report.

For details as to the take of striped bass and bluefish the reader is referred to the various reports under Marthas Vineyard and Shore Fisheries. It can be said here, however, it is the consensus of opinion of the fish men and fishermen of the Cape and Islands that it seems now to be only a matter of time when bluefish and striped bass may once more be found in these waters in considerable abundance.

Cape Cod Activities

It is very certain that the catch of fish in Cape Cod waters this year was much larger than last. It is also certain that while in some cases larger prices were obtained for some particular species, because of the scarcity in the market at the time of marketing was higher than the previous year, yet on the other hand some fish taken as a whole did not bring as much money as in 1927. However, there is no doubt that the Cape Cod catch this year exceeded in value by some appreciable amount of dollars what was paid out to the fishermen in 1927. For instance, last year while ten men fishing a string of ten traps shared about \$1,100 for the season, what could be considered as practically the same outfit, one crew of five shared \$1,000 while the other crew of five shared \$1,500. Outside of this is to be considered the very much larger catch with the traps which are placed in the freezers and which are marketed during this fall and coming winter season and also the increase of labor incurred by the additional and larger catch.

In addition to the good news contained in the above paragraph it must be considered also that weather conditions during the whole season were good for trapping, which means a very small loss of twine because of storms.

It is safe to say, and it is a good deal to say, and it can be safely asserted that the catch of the traps this year at Provincetown was 75% better than the previous year and also that the flounder fleet practically doubled the catch of the year before, or that at least it did, financially speaking, twice as well as it did the year before. Last spring the mackerel netters did unusually well and this fall some have already done fairly well. In all it is safe to say that the mackerel netting game can show a 50% increase over the year before. Very little codfishing was done this year and even at that the catches of the boats run 50% ahead of the year before. There was a most marked increase in the catch of whiting and this was particularly gratifying to not only the trap owners but to the people of Provincetown generally,

because it meant much more employment during the winter months. It seems hard to realize that where the year of 1927 was considered on the Cape as "fair," that this year at Provincetown the whiting catch was 200% above that of the year before.

The herring catch of this season and last were about the same. There was good fishing in the spring, but nothing after that and no fat summer herring were in evidence. "Sardines" were not so plentiful as the year before, in fact the catch was about half of that of 1927. Very few sharks were taken this year and horse mackerel or tuna were not in very liberal receipt. No striped bass were caught as far as known and no bluefish of any size. There were no large bluefish. The catch of mackerel was about 25% better than in 1927.

There was good spring fishing on butterfish and a few were taken all summer. It is estimated that the total catch was 25% better than 1927. As to squid, the same story as to the whiting catch applies, because the catch was at least 200% more than the previous year. It is safe to say that in the freezers there are plenty of squid to supply all the demand. The Provincetown experts note with a great deal of satisfaction that a lot more mackerel were schooling in Barnstable Bay this year than for quite a number of seasons, and that the catch in that splendid and almost perfect body of water practically doubled that of last year.

At Truro the traps doubled their catch of the previous year, while at Brewster they did not do as well; also the catch at Barnstable was not what would be considered satisfactory. The mackerel seiners this summer caught quite a lot of blueback herring which were sold for bait and found a very ready market. It is interesting to note that notwithstanding the large catches of mackerel it was not necessary to salt any trips at this port this season.

At Chatham the scallop season again was very poor indeed, it being practically impossible after the first few days for the fishermen to get their daily limit. On this account the fishery was abandoned by many and few continued to pursue it. During the year the traps in this vicinity did very well, especially when the squid started to run. Prices were very good on these for about three weeks, but later on it was almost useless to ship, as expenses could hardly be met on shipments. There was also a good run of whiting on which the trap men profited accordingly. The most noticeable feature of the fishing season at Chatham was the increase in the run of striped bass. These fish ran from two to forty pounds, and some truly wonderful catches were made. In one sweep of a sweep seine one crew took a ton of these splendid fish and the day's work for the same gang netted 6,000 pounds. As these fish bring a very fancy price in the New York market, somewhere around 30 to 35 cents a pound, the financial settlement gained by the delighted fishermen can easily be figured. It is stated by the fishermen that the striped bass catch here and in this vicinity was the largest for at least 25 years and that these splendid sporting and good eating fish are returning to the waters of the Cape is pleasing to record. There was also an increase, a gratifying one, in the take of bluefish, and it is interesting to note that over last year a marked increase in the size of these "blues" was very apparent, for some of the fish caught were of the size that the old timers still delight to tell about.

It seems to be the opinion of the fishermen, not only at Chatham, but all around the Cape that the lobster fishery is sinking a little each year. Certainly at Provincetown it was very poor. The men at Chatham may have made as much money as last year, but if so it was on account of the higher price, for they caught less lobsters.

At Yarmouth the fishermen report a larger catch of mackerel than last year and that the fish also brought higher prices, while the catch of butterfish, codfish and the take of sand eels was about the same as in 1927. At Yarmouth also the lobster catch was about the same as last year, but it is figured that higher prices were paid.

Nantucket Fisheries

While the flounder landings at this port were not as large as the previous year, which total again shows a decline from the year previous, yet it is the opinion of the captains that the flounder fishery taken as a whole and including the landings at all other Massachusetts ports and New York was as good, if not better, than the previous year. The fact is that where, several years ago, the great bulk of flounders were landed at Nantucket and shipped through to New York, nowadays crafts with full fares or large trips simply cease operations on the fishing grounds and make a straight wake for the New York market, there landing their fares direct, while the trips that come to the Island and are taken out are those which might be called part fares or broken trips or landings made expedient by weather conditions. Some of the captains seem to feel that the fishery was not as good this year, taken as a whole, as last year, but for the lack of actual statistics that opinion cannot be backed up by figures. The captains say that the weather as a whole was better than the year before, but that they did not seem to be able to find the fish. However, they aver that it came quite closely up to a standard year's work.

As to quahaugs, it is estimated that about 16,000 barrels were taken here during the year. About 22 boats fished on the off shore grounds and 15 confined their operations to the harbor bottom. This total is certainly not up to previous years and in the opinion of buyers and the fishermen themselves, there seems to be a gradual decrease in the supply and catch.

The scallop season, from what little can be learned at this writing, has opened very successfully, but it must be recalled that the fall and winter season of 1927 showed splendid fishing and that this fine opening of last year was followed by a marked diminution in catch, so much so that many of the boats engaged were forced to give up the fishery. It is hoped that this will not prove the case this year. There is very little to be said in regard to any other branches of the fisheries as they are not pursued to any large extent from this Island.

Buzzards Bay Fisheries

This year, as usual, the story of the fisheries catch in Buzzards Bay is one of marked interest, because of the fact that under state law the waters of the Bay are closed to certain methods of fishing. From the consensus of opinion of expert observers it would seem that gradually fisheries conditions in the Bay are improving, although this statement, based on the reports, is not considered of sufficient volume to as yet seek any change in the present regulations covering fisheries conditions therein.

There has been a good increase in the number of codfish taken in the Bay this fall and many of the smaller boats which have been fishing just off shore have been getting fair catches.

There has been little difference in the catch of flounders this year, although some of the fish traps along the shore have taken quite a few very small fish, which, while it could not be helped, of course is not considered conducive to conservative fisheries measures.

A good increase in the number of tautog taken both last spring and this fall is noted. This increase is credited to the new law which went in force this year prohibiting trawl fishing at the head of the Bay where these fish go every year to spawn.

About the usual run of mackerel has been noted in the Bay, although the very small fish which are usually seen in the fall, that is, the first year spawn, have not been seen in the usual number.

It is very gratifying to record that for the first time in twenty years bluefish of real sporting size have been taken on hook and line in the Bay. These fish ran from three to seven pounds and while they were not plentiful, they were taken in goodly numbers for some two weeks or more. As to "snapper" blues, or small sized fish, there was one of the largest runs New Bedford, South Dartmouth and Westport waters have seen for years. One could easily count from 100 to 150 people fishing at one time on the New Bedford

and Fairhaven bridge and also the same story fits for South Dartmouth for a period of nearly three weeks and the catches would run full forty fish per person. It was really quite a sight to witness, especially so where Buzzards Bay has been practically denuded of bluefish for a long term of years. At Hix Bridge on the Westport River there was also a heavy run of snapper bluefish.

Squeteague were taken on hook and line in the Bay this year, something that has not been heard of for ten years or so to any extent, the traps at Salters Point making a catch of 97 in one night. It will be remembered that last year was the first that any of these fish really came back into the Bay and then only a few were taken in the traps.

A fair increase in the catch of striped bass is noted in the traps this year. It is interesting to note here in passing that striped bass struck in all along the southern part of our coast from Buzzards Bay to Chatham.

For some reason the catch of butterfish in the traps was not as large as last year. There seemed to be spells when none of these were in the Bay at all, then there would be catches of quite a goodly amount and in a few days it would fall off again. For this no reason can be assigned.

A good increase in the catch of smelt is noted at South Dartmouth and Westport. The fish were actually seen to enter the Mill Pond at Russels Mills, South Dartmouth, this year, which is considered a good sign by the smelt fishermen.

The white perch catch was about the same as last year and large catches of whiting were made in all the traps along the Bay shore. The take of bass was about the same as last year and strangely at the opening of the lobster fishing season, a good number of these fish were also taken in the lobster pots. There is a large and gratifying increase in the catch of eels. As to squid, all of the fish traps in the Bay for at least a month during the summer made large catches, even the small traps getting from 15 to 20 barrels a day. This same story of the squid will apply to the take of "sardines" or small herring. The regular sized herring were a little late in starting their run into the Bay, but the catch was better than last year, so much so that the price dropped to one dollar a barrel in the middle of the season.

As Buzzards Bay is practically the greatest almost enclosed body of water within the confines of the Commonwealth and more legislation has been written around it than possibly any other body of state water, it is necessarily in the limelight. Therefore, it is only natural that the viewpoint of trained observers may differ somewhat in the opinions formed at the conclusion of a fisheries year. After careful conversation with many men from many ports of the Bay, it seems that beside the above statements the following very much epitomized story can be given and will be very interesting to those to whom the fisheries of this Bay are of first importance, always bearing in mind that this wonderful body of water is practically a pleasure ground for those who love to fish with hook and line.

Squid.—A large increase over last year, in fact twenty times as many as in 1927, but no summer squid.

Bull's-eye mackerel.—*tinkers*.—A very large increase, in fact in the opinion of many fishermen fully fifty times as many as 1927.

Butterfish. A good increase, with a steady run for the season and larger fish taken than last year.

Lobsters.—A big increase the first part of the year, but the crustaceans ran small. There was a big run in September of medium size, but a decrease in the catch of the large lobsters.

Mackerel.—Rather a poor year, only about one-fifth as many being taken. Six of the fish caught in the Bay as far as could be ascertained had rubber bands around their gills. The origin of the placing of these rubber bands is a mystery with all fisheries men and has never yet been solved.

Flounders.—There was a large increase in the take of "blackbacks" of large size and a decrease on small.

Flukes.—Ran in about the same proportion.

Swordfish.—About the same number were taken as last year and but for poor weather at inopportune times the catch would have been larger. Five jellied were taken about the middle of August and properly relegated from commercial consumption.

Codfish.—A great increase is noted over the last year, but the market was poor and the average size was better than in 1927.

Haddock.—Not as many were taken as in last year, but the fish ran larger as to size.

Squeteague.—Quite a decrease in number taken, but the fish were larger; perhaps 1,000 pounds in the whole season would cover the Bay's catch.

Scup.—There was quite a large drop in the catch of this year from that of 1927.

Striped Bass.—It is encouraging to report a large increase in the catch of these splendid fish the whole length of the Bay. It is cited that one who simply fished for pleasure, got over fifty fish. As these fish ran from two to forty pounds each, some idea of sport arising from the taking of the same can be readily imagined.

Bluefish.—There was a decrease of the catch of "blues" in this Bay, but to the eastward along the Cape Cod shore and down to Chatham the fishing for the same was very much better indeed. As far as could be ascertained six fish were caught off Woods Hole, which averaged $3\frac{1}{2}$ pounds each.

Menhaden.—None were taken in the Bay this year; in fact these fish were reported very scarce all along our shore.

Tautog.—A very gratifying increase in the taking of this most edible fish is noted over the catch of 1927.

Alewives.—A marked increase over 1927 was noted, but as the market price was very poor very few of these fish were taken.

At New Bedford, from which a great many of the flounder dragging fleet sail and also where they are owned, but mostly landing their catches at New York, the report is of a decreased landing of fish than last year, although in some specific instances the catch of other species exceeded that of the previous season. This is believed to be true as regards swordfish and mackerel; of the former 1,074 fish were landed of an average of 200 pounds each, and 10 of these fish were found to be jellies and were promptly condemned and removed from all possibility of being used for human consumption. As to mackerel, there were 2,660 barrels landed at this port, which is also considered above the landings of 1927. These landings do not indicate by any means the full extent of what this market is capable of absorbing, but the fact is that during the latter part of the summer and fall the catches were mostly of bull's-eye mackerel for which there was little sale or demand and which simply meant a possible "breaking even" on the shipment and very little chance of any profit. Of these fish, landings at New Bedford could easily have been doubled as to quantity.

While the catch of fish in Buzzards Bay is rather small, even including that which comes from traps, it is well to remember that two important fishing ports of Massachusetts are located on the shores of this bay, namely Woods Hole and New Bedford, and that both are rapidly increasing in importance in this direction. It is unfortunate that we have no method by which the total catch at each port can be given, but it is safe to say that it runs well into the millions of pounds in both places, the catches being shipped to various nearby cities and the bulk to the New York and Boston markets. At Woods Hole much more fish was landed than the previous season, this being due to the fact that many larger crafts have landed their catches there. It can also be said that these larger landings met with a smaller financial total return than the previous year, because of the increased supply.

The Woods Hole report as to fisheries in the vicinity is from a commercial standpoint and therefore very interesting indeed. The dealers there report a larger increase in the take of striped bass than for at least twenty years, many especially large catches being made along the East Falmouth shore. The landings of mackerel ran short of last year's receipts, but as to bull's-eye mackerel it can be said that there were so many it was almost impossible

to make a shipment and get one's money back. Blackfish, or tautog, were quite plentiful during the summer, but the takes fell off during the fall. Bluefish seemed to have gone around to the other side of the Cape, as very few were found in this vicinity. The catch of swordfish ran about the same as last year.

A gratifying note in the report is to the effect that the lobster landings at this port and the fishery in this vicinity was exceptionally good but the lobsters ran smaller in size than usual.

There was an exceptionally good run of butterfish, the size being on the average much larger than last year, while the landings of scup were not up to that of 1927, but prices were very good at the beginning of the season. The catch of squid was very large. At the first of the season prices were very good, but towards the end it was almost impossible to make a shipment and get the money back. Scallops were very plentiful, in fact it can be called a most successful season and way ahead of last year and taking everything into consideration prices must be considered as good.

Martha's Vineyard

Marthas Vineyard fisheries for the year show an increased catch over 1927 and also a better financial return. In connection with this also it is gratifying to record that certain fish which have not been very much in evidence for some time again put in appearance.

Inshore the floundering was from fair to good and prices were fairly high all the fall. Winter (tub) trawling was exceptionally good as the weather man was lenient and the fish ran fairly plentiful and of good size, being mostly codfish, with a few haddock mixed in. Scalloping last fall was spotty, but Edgartown and Nantucket both had a good season. Spring otter trawling was rather discouraging as to prices and there seems to be a growing tendency among those connected with the fishery to favor a closed season during the spawning period.

Trap fishing was only fair, the fish running not too plentiful either in the Bay or in the Sound; scup were scarce and when the mackerel came in the price was very low, due to the enormous catches made by the netters and seiners. Bull's-eye mackerel were a regular nuisance to the trap fishermen during the summer, they having to run hundreds of barrels of them over the top line daily, and let them go as there was absolutely no market for them.

There was a noticeable increase in the run of bluefish both as to the numbers and size. There was also a remarkable run of striped bass, with quite a few good hauls being made by sweep seines. These fish all run about six pounds each. Swordfish were fairly plentiful on the inshore grounds, the most being caught about twelve miles south southwest of No Man's Land. Sea scalloping was not carried on as extensively in this vicinity as the year before, only six boats being engaged as compared with fifty last year.

Lobstering was the best it has been in these waters for the past five years and the fishermen are unanimous in the belief that the purchase by the State of egg-bearing lobsters is the most constructive piece of legislation affecting the fisheries that has yet been enacted recently. However, time will tell how beneficial it is.

The handline fishing fleet have not had as prosperous a year as is general. There seemed to be plenty of scup and sea bass everywhere, but they did not seem to bunch up and bite as usual. There are about forty boats engaged in this line fishery in this vicinity and the movements of these fish means a great deal to the men who put the lines overboard. Flukes were scarce but ran to good size with prices holding steady at about ten to twelve cents a pound out of the boat.

The Vineyard boats this fall out in South Channel did some mighty fine work at dragging. The *Liberty*, in a twenty-minute drag, took her mast head off hoising in one batch. Winter floundering is on again now and fair returns are being made from the New York market, flounders of good size selling at times at \$20 a barrel in New York, although there are days when

through a flood of shipments the price of \$8 a barrel, which just barely meets shipment expenses, is met.

Scup.—Not as many as in 1927. Actually there were more fish here, but the school was always on the move and they were lost every two or three days. When the handliners struck the fish they caught plenty of them. One small boat with two men in the crew, handlining, brought in 1,000 pounds for one day's catch.

Sea Bass.—Quite plentiful, but not as many caught as last year. They ran much larger in size and most of the fish stayed around Muskeget, which is a bad place for small boats to fish and the fishermen had to pick certain days to go there.

Tautog. Tautog were about normal. Returns do not show much, as the best tautog market for this section is New Bedford and the market in New Bedford is crippled by the strike in the cotton mills. There are few, if any, shipped from here.

Mackerel.—Much more than last year and very much closer inshore than in many years. They are small sized, big mackerel being very scarce, but plenty of tinkers and bull's-eyes. The traps in the Sound took thousands of barrels of bull's-eyes, but found no market so they had to dump them.

Squeteague.—Not quite as plentiful as last year, but those caught ran better as to size than last year's catch.

Bonito. There were many more bonito than usual, but not many were caught. The largest bulk of the fish were sighted and seem to have stayed farther to the westward. There were plenty of these fish around Newport and Block Island.

Summer Flukes.—The catch was nowhere near normal in quantity. Otter trawling all summer was very poor, but those caught were of a very large size.

Blackbacks.—The blackbacks were late coming, but are very plentiful and are away ahead of last year in quantity. The fish run very small.

Bluefish.—Bluefish were more plentiful than for a great many years. There were more bluefish caught from the shores of the Vineyard than in thirty or more years. The commercial fishermen did not get a great many of them as they did not seem to trap well.

Striped bass.—The same may be said of striped bass as for bluefish. The catch was unusually large.

Butterfish.—These fish have run exceptionally well and were way ahead of last year in size. They ran mostly to mediums, trapped well and practically all of the traps in the Sound reported 50% of their catch were "butters." They were here unusually early and stayed late.

Swordfish.—Swordfish in local waters were more plentiful than for a great many years. Some were taken in Vineyard Sound. The fish as a rule ran quite close inshore and many were taken by lobster fishermen.

Pollock.—There were no pollock taken to speak of this year. There were few around, but when they were seen the weather was so bad that it did not pay to go after them.

Codfish.—Codfish were very plentiful. They came close inshore and more were taken last winter than ever in the history of the Island it is claimed. The indications now are that it will be even better this winter if the weather is right.

Haddock.—Very few taken locally, but in nearby waters the catch has been normal.

Lobsters. Lobsters are away ahead of anything in recent years, all the fishermen reporting a very successful season. The lobsters ran a month later than is usual. The fishermen had exceptionally good weather and did not lose any gear through storms, but did lose a lot of it through the activities of a squadron of United States destroyers who seemed to persist in running through their gear.

Waste fish.—There was a scarcity of waste fish. Plenty of dogfish, but they only stayed for a short period of time. Very few small sharks and very few skates. On the other hand more southern or tropical fish were taken

than for many years. There were some pompanos, barracuda, kingfish, spanish mackerel, flying fish, and tarpon. A lot of these were not fit to eat, especially the pompanos. There were not many squid, the usual run being way below normal, almost no menhaden and not as many whiting as common. Small bait such as sand eels, silver sides, etc., were never any thicker in years and they were thick all over, both in the Sound and outside, and quantities of very small blues, scup, pollock and mackerel were feeding on this bait and keeping well inshore.

The run of herring was about normal for the season, although not so many were taken as in other years, due to the fact that they were unable to do any fishing at the Mattakeesett Creeks.

The white perch fishing fell a little short, but was about as good as average. In a trap off Quissett a sulphur bottom whale about 20 feet long and 7 feet across the flukes was found one morning drowned in the trap. Also a twelve foot calf sperm whale came ashore on the south side of the Vineyard alive. These whales were presumably chasing schools of bait when they were trapped.

There were some sea-turtles seen near here which was not very common. From the Edgartown end of the Island there comes a very interesting report to the effect that yellow tails were taken in about the usual amount in this section during the winter months and so many vessels were fishing on this favorite spot in the vicinity of Muskeget Channel buoy that the school of fish was soon broken up.

Owing to the beach breaking through at the breeding pond just at the beginning of the season, no alewives were taken here this year; however, more spawned fish were noticed going out and also many more young fish than usual. The beach was closed May 9 and next season's fishing will probably be as good as usual. Very few large mackerel were taken here during the spring and most of the boats gave up netting. In September and the first part of October blinks, and bull's-eye mackerel weighing about one pound each, were very plentiful. As to swordfish, there were more sighted and taken in the inshore waters than for five or six years. Scup were rather plenty, but the market was so poor that few boats were fishing for them. Sea bass were reported more plentiful than usual, but no boats went after them.

Some bluefish were around this section nearly all summer and a few were caught off the shore in September weighing from five to eight pounds each, which indeed is very encouraging news. As to striped bass, there were more of these splendid fish in these waters than for the last fifty years. As an example of their plentitude it can be said that one man on November 4 caught twenty-one of them from the shore "heaving and hauling."

Clams are scarce and quahaugs are about as plentiful as usual, but not as many were taken on the average as so many of the boats were chartered by summer visitors for pleasure trips. Scallops were scarce in January, February and March, but there are rather more than usual this fall. On the whole the season at the Edgartown end of the whole Island has been rather better than the average of recent years.

Boston Fishing Activities

It is once more a matter for congratulation that the port of Boston, the largest fresh fishing port in the western hemisphere, has again shown a remarkable increase in fish landings. Not only this, but it is to be especially noticed that more trips have been landed, which naturally means that the captains are making shorter trips, that is, are making their trips in fewer days, evidently impressed with the idea that landing newer fish means keeping up the quality standard and that keeping up the quality standard means a higher price for their goods. As is well known the fishing fleet of Boston is being largely increased; indeed it might be said at the present time at the close of the year 1928, after many splendid crafts have been launched in the past ten months, that the building ways at all available ports within hailing

distance of Boston seem to be entirely taken up with crafts in process of construction which will bear upon their sterns the hailing ports, not only of the Hub, but of other Massachusetts cities and towns. Indeed it can be safely said that the Boston fish business is certainly on "big time," with every week occupied.

The Boston fish story would be incomplete without an expression from Mr. Fred F. Dimick, Secretary of the Boston Fish Bureau, whose report is to be relied upon. Mr. Dimick says:

"The wholesale fresh fish business of Boston during the year 1928 has been good, and a large number of new steamers and vessels have been added to the fishing fleet. The receipts of fish at Boston direct from the fishing fleet for the seventh consecutive year shows an increase, an increase of more than one hundred per cent, a march of progress unparalleled in the annals of the fish trade. This increase has been largely due to the development of the business in filleted haddock. This business started in the year 1921 in a small way, but has steadily increased.

"The vessels engaged in the groundfish fishery have had a successful year. The schooner *Lark*, Captain Ernest Parsons, made an outstanding stock, probably the largest ever made in this fishery by a vessel. This vessel landed 5,553,162 pounds of fish and stocked \$174,477, each of the crew sharing \$3,650.

"A number of the large vessels have changed over recently from line trawling to dragging. In the operation of a dragger less men are required, and the fishermen make larger shares.

"In the spring of the year good catches of haddock were landed from the South Channel and South Shoal Lightship, but in the fall of the year fish were scarcer than they have been for a number of years. During the summer time all kinds of fishing operations were hampered by foggy weather. In the early fall the draggers made good catches of codfish on the Rips, the best for a number of years. The handline codfishermen as a rule landed light catches of fish and reported bait scarce on the grounds. They obtained good prices for their catch however, and had quite a successful season.

"The mackerel seiners did not land as many mackerel as the previous season, but had a successful season. The mackerel netters, in both the spring and fall, had the best season for a number of years.

"The swordfish vessels were successful on Georges Bank, but had poor success on Cape Shore. The catch of swordfish amounted to 16,152 fish, compared with 12,450 the previous year. The receipts from Canada at this port amounted to 2,387 fish, compared with 1,765 the previous year.

"The catch of fish in the Cape Cod traps was the best for four years. There was a good catch of butterfish, squid and whiting. The catch of herring, however, was light.

"Receipts of fish from Canada have been light, but in the case of swordfish and mackerel a little larger than the previous year. The receipts of fresh mackerel were 4,745 barrels, compared with 4,126 barrels the previous year.

"Salmon and halibut have been in good supply from the Pacific coast during the year 1928. Cars of swordfish, similar to the swordfish caught on the east coast, were received during the summer, and were in good demand. This is a business that promises to develop in the future. A small shipment of boneless filleted salmon were received from the west coast recently and effort is being made to introduce them in the east.

"The Atlantic coast halibut fleet was about the same size as the previous year. The first of the season some good catches of halibut were landed, but arrivals most of the season had light catches and reported fish scarce."

RECEIPTS OF FRESH FISH AT BOSTON, DIRECT FROM THE FISHING FLEET, FROM DECEMBER 1, 1927 TO NOVEMBER 30, 1928

	Pounds
Large Codfish	24,426,905
Market Codfish	15,406,558
Cod Scrod	87,890
Haddock	121,587,472
Haddock (scrod)	12,143,585
Large Hake	5,663,183
Small Hake	73,000
Pollock	2,954,785
Cusk	1,560,014
Halibut	3,286,376
Mackerel	15,114,960
Swordfish	2,263,437
Miscellaneous	8,106,759
Total	212,674,924

The Gloucester Fisheries

In keeping with the general progress of prosperity in the fisheries industry the port of Gloucester has not been omitted. While it would seem, from scanning cold figures, that the port is losing some of its old prestige, yet a close reading of the facts will show that this is not the case. At present, Gloucester is not able to secure landings at its own wharves sufficient to fill the needs of those who call upon it for fish. This, of course, is evident to one acquainted with fisheries conditions, but for the benefit of those who do not know we can say that the bulk of the fish landed by Gloucester vessels is taken out at the great port of Boston and at other ports along the coast as far down as Fulton Market, New York, and Cape May, New Jersey, and up to Portland. The table which accompanies this story will attempt in a way to show the facts as regards the amount of fish brought to Gloucester during the year.

A significant feature of the Gloucester report is that the amount of fresh fish brought in during the spring and summer months from the eastern banks and intended for salting, pickling and curing was a great deal less than for some time past.

At the same time, it is a most encouraging feature to learn that while there is a great increase in the demand for fresh fish in all the styles that it is now put out, that also the demand for salt fish has increased amazingly. It only goes to show that the public, once "sold" to fish of good quality, will continue to demand it, whether it is fresh, canned, salted, smoked, pickled, etc. To this basic fact is due the increased prosperity of Gloucester as a fish producing and shipping port.

The fish story of Gloucester for the year is one of prosperity as far as vessels and fishermen are concerned. Indeed it is doubtful if many years have equalled this one in proportion to the amount invested. While the business year as taken from the firm standpoint will admittedly gross larger than the previous one, yet based on the cost of production it is doubtful if the financial return will equal that of the previous year. Yet, however a fair-minded view of the situation would indicate a very prosperous year not only for the fishermen but for the dealers and shippers.

The following table gives the landings by American fishing vessels at Gloucester as reported by the United States Bureau of Fisheries from December 1, 1927, to November 30, 1928:

76		P.D. 25
Cod, fresh:		Pounds
Large	.	12,220,957
Market	.	2,589,100
Scrod	.	309,236
Cod, salted:		
Large	.	670,915
Market	.	151,071
Scrod	.	550
Haddock, fresh:		
Large	.	7,998,800
Scrod	.	648,600
Hake, fresh:		
Large	.	268,825
Small	.	2,355
Hake, salted:		
Large	.	1,875
Pollock, fresh	.	1,604,855
Pollock, salted	.	8,430
Cusk, fresh	.	280,795
Cusk, salted	.	5,605
Halibut, fresh	.	187
Halibut, salted	.	3,707
Mackerel, fresh	.	6,976,611
Mackerel, salted	.	115,910
Flounders, fresh	.	185,090
Swordfish, fresh	.	18,340
Herring, fresh	.	252,800
Other, fresh	.	1,218,102
Other, salted	.	3,170,496
Total, fresh	.	34,574,653
Total, salted	.	4,128,559
GRAND TOTAL	.	38,703,212

In reading this rather meager total it would be borne in mind that it contains no figures as to the amount of fish brought to this port by foreign crafts or by crafts from the Treaty coast of Newfoundland, or by vessels from the Maine coast with cured fish, and neither does it take notice of unregistered crafts of our own which are under five tons. If the amounts brought in by these various crafts should be added to this total it would be found that the amount of 56,494,846 pounds landed from all sources last year would in our opinion be considerably increased and to this end the following additional figures are offered:

	Pounds
United States unregistered crafts under 5 tons	5,000,000
Cured fish from Maine ports	2,000,000
Fish, not the product of American Fisheries, and also from Treaty coast	8,000,000
Fresh fish trucked to Gloucester from the Boston Fish Pier	9,000,000

Combining these latter figures with the United States Bureau of Fisheries' total will give a total of 63 million pounds, thus showing that actually instead of less fish being brought to the port of Gloucester than the previous year, there was actually an increase in the receipts of almost seven million pounds.

SHORE FISHERIES

General

While naturally not as productive in total amount of catch or value as could be wished, it must be understood that Massachusetts always takes a very strong interest in its shore fisheries and to that end it is the idea of this

office to make a full and complete report in order that the many small dealers and crews of small fishing craft will understand that the Commonwealth is as much interested in their fisheries welfare as that of the big vessels and trawlers that sail from Boston and Gloucester to the far-flung banks from the Hatteras Cape to Labrador.

It will appear to the reader that the story of the shore fisheries is a most interesting one as it touches the pulse of all the small places along our sea border line where even a dory is a source of supply and sustenance and maintenance of the family. For this reason we have devoted a considerable space to the fisheries story of the smaller places and let the tale of our two leading ports, Boston and Gloucester, appear under another heading.

From a careful survey of the reports that come to us, all of them from sources whose knowledge and authority is undoubted, it is apparent that the year has been one of increased productivity and increased financial returns to these hardy people who venture their all in the fishing game. There are especial features which later on in this report will be brought to the front, but the point it is desired to bring out and emphasize is that the fisheries industry as represented along the coast of the Commonwealth, far from being a declining one, is showing a most gratifying increase both from the financial and numerical standpoints.

Starting with the New Hampshire line and working down the coast it is noted that the catch of smelt through the ice during the winter months in the district from Salisbury to Marblehead was small, but to offset this, careful observers noted that when the fish came in to spawn in the spring, especially at Byfield flats on the Parker River and at Mill River in the town of Rowley, it was the largest run for years.

The lobster catch for the district is reported from reliable sources to be the largest for twenty years at least and this is accounted for by the throwing back of short lobsters and seeders. The dealers and lobstermen themselves believe that the law which was passed at the last session of the Legislature with reference to the payment for seed lobsters and the proper punching of the same was one of the best things the State has done to help the lobster situation for a long time.

The alewife run was very heavy in this district this spring in all of the streams. It is unfortunate to note that the eels being depleted in the Parker River in the town of Newbury was caused mainly by the fishing or spearing from boats. A town law has been passed against this. White perch ran into the Parker River in great numbers during the spring and summer and the fishermen had great luck in their catches, some taking as high as sixty pounds of these fish in a day. Where these fish came in is entirely salt water and no license is required to catch them and quite a number of fishermen came to this district to take advantage of this situation. It seems competent here to suggest the advisability of requiring a sporting license for the taking of smelt and white perch.

The clams are being depleted in the open areas because of the increase of regular diggers, also transient diggers because of the lure of high prices offered in the market. It is unfortunate to observe that the regular diggers do very little re-seeding and take the small clams as well as the large and give the flats no rest. On most of the contaminated shellfish areas in this district clams have come back in large quantities especially in Newburyport Harbor areas. When digging was allowed there were times when these flats were absolutely depleted, but now, with a little over two years' rest, these flats are simply alive with clams. Some clambers are fighting to save the flats from being depleted, but, on the other hand, there are others that take the attitude that the clams are always there, that they always will be and that he will get all he can of them, large or small, and tomorrow will take care of itself. The incorrectness of this attitude will be recognized by all.

Large numbers of bluebacks and sand eels were taken at the mouth of the Merrimack River this year and some of the boats reported good takes of cod, haddock, flounders and mackerel.

Swinging along into the district from Marblehead to Neponset it seems that

the lobster fishermen had a fair year and the prices have been good. The lobstermen in this district report a large number of small lobsters, in fact one old fisherman says he has seen the largest number of shorts this year than for the last twenty years. The herring fishermen had a good catch, somewhat above the average, while the codfishing was about the average of the past three or four years. Flounder fishing was fair and also a good catch of smelt was reported up to date.

As regards clams this area is practically considered contaminated, but plenty of clams are reported in the flats.

One significant feature on which considerable weight might be placed is the report of the large number of seals in Lynn Harbor. Some up as far as the Pines and Saugus River counted twenty-three in one herd in Lynn Harbor. It is only necessary to note here that the seals live on "school" fish and that they are commonly accounted as each consuming one to two barrels a day, to indicate their destructiveness to fish life.

It might be well from this report to consider a change in the law on the bounty of seals which now makes a man bring the whole pelt to the city or town clerk and receive therefor \$2.50. The original bill in this case called for \$10 per seal and even at this figure, allowing for a greater number to be killed than for the past five years, fisheries statistics would show the State and its fisheries to be the gainer.

There was a fairly good catch of crabs this year, but only a few were engaged in this business which is, however, increasing each year as the public seems to take to crabs in salads the same as it does lobsters.

From Quincy around to the mouth of the Cape Cod canal on the Bay side the story is that the mackerel fishery was not as good as last year, but that herring had been very plentiful along the South Shore and at the present time the various freezers are well supplied.

As to the lobster fishery, there was practically no spring fishing on account of bad weather. In some sections, because of the planting of small lobsters from seized under-sized Nova Scotia shipments at Brant Rock and vicinity, there has been a decided change in the industry and good results are being shown, so much so that the fishermen in this district have formed an association having for its object the protection of the short and seeded lobsters and indicating their desire not to deal in shorts. This idea, if adhered to, means the promise of a great deal better season for the next year.

In the spring of 1928 there was a good run of smelt to the spawning grounds, the fish making their appearance in three distinct heavy runs during the early part of March. Previous to this and after the heavy runs there was a scattering of fish in the smelt brooks and during the late summer months and up to the present time the smelt fishery has been very good all along the South Shore. It is improved to the extent that some men have found it profitable to catch these fish for market. In all sections along the South Shore the haddock and codfishing has been very poor and it is only now in the late fall that the codfish is coming within reach of the South Shore fishermen.

The North Shore

The northeast corner of the State coastal waters, which are in the vicinity of Newburyport, show a positive dearth of fisheries activities and it can be said without doubt that fishing operations in this vicinity have reached the lowest ebb in their history and aside from the probability that the clamming industry may be restored to a limited number of clammers in Salisbury, Newburyport and Newbury who are now trying to eke out a living on restricted areas by the establishment of a larger municipal clam clarinating plant at Plum Island, things look bad.

A small experimental clam clarinating plant has been in operation there throughout the summer, and has demonstrated that it can be successfully operated and its treated product readily marketed. This plant was only able to handle a limited number of clams at each operation and but four diggers sufficed to keep it going at full capacity. The uncontaminated clam

flats are subject to intensive digging and the clams are becoming smaller and scarcer on them each year because of the excessive demands of the market. Certain flats have been closed by the towns of Newbury and Rowley to allow for necessary propagation and growth, but for very short periods. Several such areas when opened to public digging again were speedily and thoroughly dug up. So very avaricious are some of these clammers that they have dug by night and day or on both ebb tides and there has been a constant warfare and protest over encroaching clammers from adjoining towns. Each town is zealous of its right to control and regulate the clam fishery therein, but there is little practical worth-while work done to build up these depleted clam flats by the towns or its clammers. The continuance of such practice can but result in placing the livelihood of the clammers in a very precarious position. The highest prices yet received for clams has prevailed here this year and yet clammers report that they have not had a very prosperous season.

The few local lobster fishermen who tried to conduct that fishery report the poorest catch of any season yet and the loss of much gear by storms early in the height of the season.

The eel and sand-eel fishermen report plenty of fish, but a very poor market demand. Once again the winter handline fishing season for smelt at Mill, Rowley and Parker rivers was a dismal failure.

While there is an annual run of alewives in the Mill and Parker rivers, there is no leased development of this fishery and because of the lack of fishways on both streams the alewives cannot ascend to the ponds where they could spawn and reproduce.

Some striped bass were observed in Parker River during the spring and early summer, few being taken on hook and line. On one occasion the unusual sight of these large striped bass, as big as large pollock, was observed in spawning operations. There was a good run of white perch in both Mill and Parker rivers during the spring and many were taken by hook and line and sold in the local and Haverhill markets. An unusual report is to the effect that several large sized sturgeon were seen jumping out of the water in the Merrimack and Parker rivers this summer, but as far as known none have been taken.

Working along to the coast section from Cape Ann to Marblehead, inclusive, it can be said that the lobster fishery is no more than holding its own, even if it is doing that. Some 175 men are engaged in this pursuit with Gloucester and Rockport as the main centers of production. The early spring and summer fishing was very unsatisfactory owing to the inclement weather and a great scarcity of lobsters. After the shedding season, which occurs during late June and July, there was a noticeable increase in the number of lobsters taken and from that time up to the present the fishing has been very fair.

The lobstermen at Gloucester, realizing that the traffic in shorts has in the past and is at the present raising havoc with the industry, organized themselves into an association having for its object the better protection of the short and seeded lobsters and they have been living up to the law better this year than ever before. They practically all agree that the fall catch of lobsters was made up of shorts that they put back in the water during the spring and early summer and which have shed and become of market size and they claim that had they not done as they did there would have been practically nothing to catch during the late summer and fall.

Although the State appropriates money for the purchase of egg-bearing lobsters from the fishermen the local crowd requested that the Department furnish them with lobster punches, and they are punching the seeders as fast as they catch them and returning them to the water without asking any reimbursement. This not only saves the Commonwealth considerable money, but it also ensures of the lobster being returned to the water without delay or unnecessary handling and offers to it the maximum chance of reproducing under most favorable conditions and at the point of capture. It is a certainty that the lobster is not on the increase in this district and un-

doubtedly there is a gradual decrease in their numbers, and unless some constructive measures are adopted to improve conditions, it is only a question of how long the industry can survive or furnish a living for those engaged in it.

The trap fishermen in this section have had a fair year. Old England hake and butterfish, on which they depend greatly for their season's work, were very scarce for some unexplained reason, and the season's catch was made up mostly of mackerel and herring. The shore netters have also taken mackerel and herring in fair quantities and herring were especially plentiful along the shore and during the summer and up to the present time, the torchers taking them at will.

During the spring quite a fleet of small boats engaged in trawling along the shore. They did very well during the spring and many of these crafts, which, by the way, are manned only by one and sometimes two men, produce some very satisfactory weeks' work. This branch of the fishery is pursued mostly in Ipswich and Boston bays and on the Flat Ground off Rockport. Since the gill netters have been fishing at some distance off shore, the ground fish have shown a decided increase on the shore grounds and this has been a boon to the trawl class of fishermen whose gear is not heavy enough to work at any distance from the shore. It seems important to note here that while the gill netters have practically given up all operations in the coastal waters, the small otter trawlers or "draggers" as they are commonly called, have taken their place and the best posted fishermen feel there is no doubt but that history will repeat itself in a short time and these waters will be again cleaned of fish, as was the case following the intensive operations of the gill netters a few years ago.

The clam industry still continues to flourish in this district, but slowly and surely the natural supply is falling off. There has never been such a demand for clams as at the present time and also there has never been so many engaged in digging them and it does seem it will be only a question of time when as far as the flats of this district are concerned, the clam will be facing extinction.

Smelt fishing in this district has been very poor during the year.

The lobster fishermen in the Lynn and Marblehead district report the best catches for many years and this piece of good fortune was accompanied by good prices throughout the season.

The South Shore

The lobster fishing in and about Boston Harbor during the past season was very poor. About 18,000 under legal length lobsters were seized from Nova Scotia shipments and liberated from this port all the way from the New Hampshire line to the Rhode Island line. Lobster fishermen report, however, the catch of many egg-bearing lobsters during the season.

The smelt fishery in this district has been very poor and this report simply dovetails in with the smelt report from most of the other districts along the shore. It is certainly coming to the point where the smelt fishery should come under the head of a sporting activity and a sporting license for fishing therefor taken out, the natural proviso being that this Division of Fisheries and Game takes the fishery under its protecting wing and makes a serious effort to increase its productivity.

Clam taking in and about Boston Harbor is prohibited by strictures of the State Department of Public Health. Notwithstanding this, the diggers continue to violate this law, to try and enforce the provisions of which seven shore wardens are now working.

At Plymouth and vicinity there were good takes of clams in the open areas. On lobsters a fair season is reported, the catch of the fishermen being very good in July. One lobster fisherman reported that he had made more money in the month of July than he had made in any one month on lobsters for twenty years. There was a fair season on mackerel. A fair season is noted on codfish and haddock and there was a good catch of small herring early and also of large herring late in the season.

In the Fall River district about twenty boats fished for lobsters from Westport and their catch was from fair to good, so that the season can be taken as financially successful as it is known that good prices prevailed all through the season. Very little was done at Westport by the quahaug fishermen as these shellfish are not very plentiful.

In the district from Marion to Westport, catches of tautog and scup were the best in years and about the average on tinker mackerel and snapper blue fish. The bluefish ran larger this season than for many years, fish weighing three and four pounds each being caught in the vicinity of Great Hill in Marion and similar sportingly encouraging reports came from those who fished in Mattapoisett and Wareham waters.

Summary of the reports of the shore net and pound fisheries, as required by Section 148, Chapter 130, G. L., follows:

Number of men engaged, 119; number of boats, 81; value of boats, \$33,610.00; number of fish pounds, 51; value of fish pounds, \$39,985.00; number of nets, 356; value of nets, \$17,138.00; catch in pounds:

Alewives	52,656	Sea bass	1,256
Bluefish	4,539 $\frac{3}{4}$	Sea herring	330,865
Flounders	6,221	Shad	8,630
Mackerel	704,310 $\frac{3}{4}$	Squeteague	15,998
Menhaden	240	Striped bass	21
Pollock	5,769	Squid	1,394,285
Salmon	—	Tautog	32,583 $\frac{1}{2}$
Scup	27, 772 $\frac{1}{2}$	Other edible or bait species	1,446,545 $\frac{3}{4}$
Total pounds, 4,031,693 $\frac{1}{4}$; total value, \$106,826.15			

The Lobster Fishery

The Legislature at its last session passed a law authorizing the Director to purchase egg-bearing lobsters at a price not above the wholesale market price for other lobsters.

This law is embodied in Chapter 263 of the Acts of 1928 and carried an appropriation of \$7,500 for the purchase of these lobsters. Under the terms of the law the fee of the lobster fishermen's license was raised to \$5, effective as of January 1, 1929, in order to provide funds for the operation of this law in the future.

The law became effective on July 25, 1928, and during the remainder of the fiscal year a total of 5,067 lobsters were purchased at a total expenditure of \$4,952.94.

The system used for this work was to have responsible lobster dealers throughout the State authorized to purchase egg-bearing lobsters from the lobstermen and hold them for sale to the Commonwealth. The coastal wardens periodically collect the egg-bearing lobsters from the dealers, mark them by punching a hole in the middle flipper of the tail as required by law, and then liberate them near where they were originally caught.

During the spring, from shipments from Nova Scotia, New Brunswick and other points outside the State, there were seized at Boston, 20 egg-bearing and 19,767 short live lobsters, all of which were distributed on favorable lobster locations along the whole State coast.

The totals of the tabulation of the returns of the year's fishing, required of the lobstermen by law, follow. The period covered is October 20, 1927, to October 20, 1928.

Number of men engaged in the fishery, 662; number of boats, 788; value of boats, \$202,116.85; number of pots used, 40,873; value of pots, \$113,763.80; number of lobsters taken, 1,199,190; pounds of lobsters, 1,788,774; value of lobsters, \$515,594.73; number of egg-bearing lobsters taken and returned to the waters, 10,958.

As required by Chapter 130, Section 106, General Laws, it is hereby reported that the number of lobster licenses issued in 1928 was 1,095.

BOUNTIES ON SEALS

The following towns were reimbursed by the Commonwealth for bounties paid on seals under Chapter 130, General Laws, Section 155: Barnstable, \$14; Cohasset, \$6; Chatham, \$2; Duxbury, \$124; Eastham, \$8; Essex, \$20; Nahant, \$2; Gloucester, \$2; Winthrop, \$2; Ipswich, \$164; Kingston, \$34; Lynn, \$2; Sandwich, \$10; Newbury, \$6; Orleans, \$2; Plymouth, \$12; Rowley, \$2; Provincetown, \$4; Revere, \$4; Tisbury, \$2; Yarmouth, \$218; fees to treasurers, \$160; total, \$800.

MOLLUSK FISHERIES

Clam

Records from the coastal wardens and information obtained from those engaged in the industry and from the diggers indicate that on the whole the season in most sections of the State where clams are found and allowed to be dug averaged as fair. The winter was very open and the weather favorable for fishery. A very fair set of young was reported for the summer of 1928. The beds at the present time in many sections are considered fair, but on the other hand there are almost as many depleted beds as those reported fair and several sections in which the areas are in extremely good condition. The market prices on the whole ranged about the same as in 1927, in fact the highest prices obtained do not anywhere go near as high as the highest obtained in 1927. The estimated total number of clams collected for the season, as far as can be learned, was about the same as in 1927. It may be remembered that there are at the present time a great many contaminated areas on which digging is prohibited.

Oyster

There are few districts in which oysters are collected and from these districts the season is reported as fair on the whole. The very open winter was favorable to the fishery, but no set of young for the summer of 1928 has been reported. The beds are all reported as in fair condition. The data collected on the industry indicates that production ranged about the same as in 1927 but the prices obtained were considerably lower this season.

Quahaug

A fair season was reported by those engaged in the quahaug business commercially. The very open winter was favorable to the fishery and a good set of young was reported for the summer of 1928, in most sections. The present condition of the quahaug beds is fair. The total production of quahaugs for the year 1928 was considerably less than in 1927 and the market prices ranged considerably higher.

Scallop

A good year was reported from those towns in which the best quahaug beds are located. The weather had no effect on the fishery because of the favorable open water and an extremely good set of young was reported for the summer of 1928 on the whole. The scallop beds are said to be in very fair condition.

The prices in most sections were lower than in 1927. The production was considerably higher than in 1927.

ALEWIFE

Those wardens having alewife streams in their districts collected the usual statistics and history of the alewife fisheries operated during the year, and any unusual conditions pertaining to these fisheries was noted.

The restoration of alewife streams, more or less depleted, was pursued at various points and the breeding grounds were stocked with adult spawning fish collected from streams in which the fish were available in good numbers. (See Fish Distribution.)

Respectfully submitted,

WILLIAM C. ADAMS, *Director*

APPENDIX

RECOMMENDATIONS TO BE CONTAINED IN THE SIXTY-THIRD ANNUAL REPORT OF THE DIVISION OF FISHERIES AND GAME FOR THE YEAR 1928.

The Director respectfully recommends the passage of the following laws:

Damage or Stealing of Property while Hunting, Trapping or Fishing.—Many complaints are received of the wilful or negligent injury to property on the part of persons hunting or fishing. It is the desire of the Division to protect landowners against the depredations of persons who do not respect the privilege which they have of hunting and fishing on private property. To accomplish this the wardens should be empowered to arrest and prosecute any person whom they find destroying, stealing or injuring property. Our wardens spend the greater portion of their time in the back country regions, and we believe that they can be used as a valuable police force in the remote rural regions.

Protection of Calico Bass and Crappie.—These species have become well established in many of the inland waters of the State, due to the restocking program of this Division. We expect to continue our efforts to establish these fish in an additional number of our inland waters, and if they are to be maintained they must receive adequate protection, as the present law affords them no protection.

To regulate the Importation of Game.—The present law gives the Director the right to regulate the liberation of wild birds or animals. This was intended to prevent the liberation of sick or diseased species. Because of the prevalence of tularemia in certain sections of the country it is imperative that the importation of wild birds and quadrupeds be regulated in order that the Division may co-operate with the State Department of Public Health in its efforts to keep this malady out of Massachusetts. This legislation is the result of a conference of Public Health officials on this matter.

Protection of Migratory Birds.—Because migratory birds are under Federal jurisdiction they can be hunted only in accordance with Federal regulations. These regulations do not always conform with the State law, leading to much confusion on the part of the public and to many complications in the matter of law enforcement, as the Federal laws take precedence over the State Laws. It seems advisable to repeal the present open season on waterfowl and give to the Commissioner of Conservation the right to make rules and regulations for the taking of waterfowl within the Commonwealth, with the proviso that such rules and regulations shall at all times conform with the Federal regulations. In that way the Commissioner may from time to time amend the State regulations to bring them into conformity with the Federal regulations. At the present time legislative enactment is necessary to bring about this conformity every time the Federal regulations are changed and many times these changes are promulgated after the Legislature is prorogued. A similar law was passed at the last session of the Legislature, covering certain species of migratory birds, and this change will place all the migratory birds on a similar basis.

Relative to Sporting and Trapping Licenses.—The present law grants an exemption to the owners and lessees of agricultural lands on which they are domiciled from the requirements of the license law. It appears to be highly desirable to grant a similar exemption to the minor children of such persons who are under eighteen years of age. As practically all of the hunting and much of the fishing is done on private land, it is also advisable to change the existing law relative to the display of sporting and trapping licenses in order that the owners or lessees of lands on which hunting, trapping or fishing is done, or their agents, may require the display of the license of persons who are hunting, trapping or fishing on that land.

